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## Improved Hot-air Furnace.

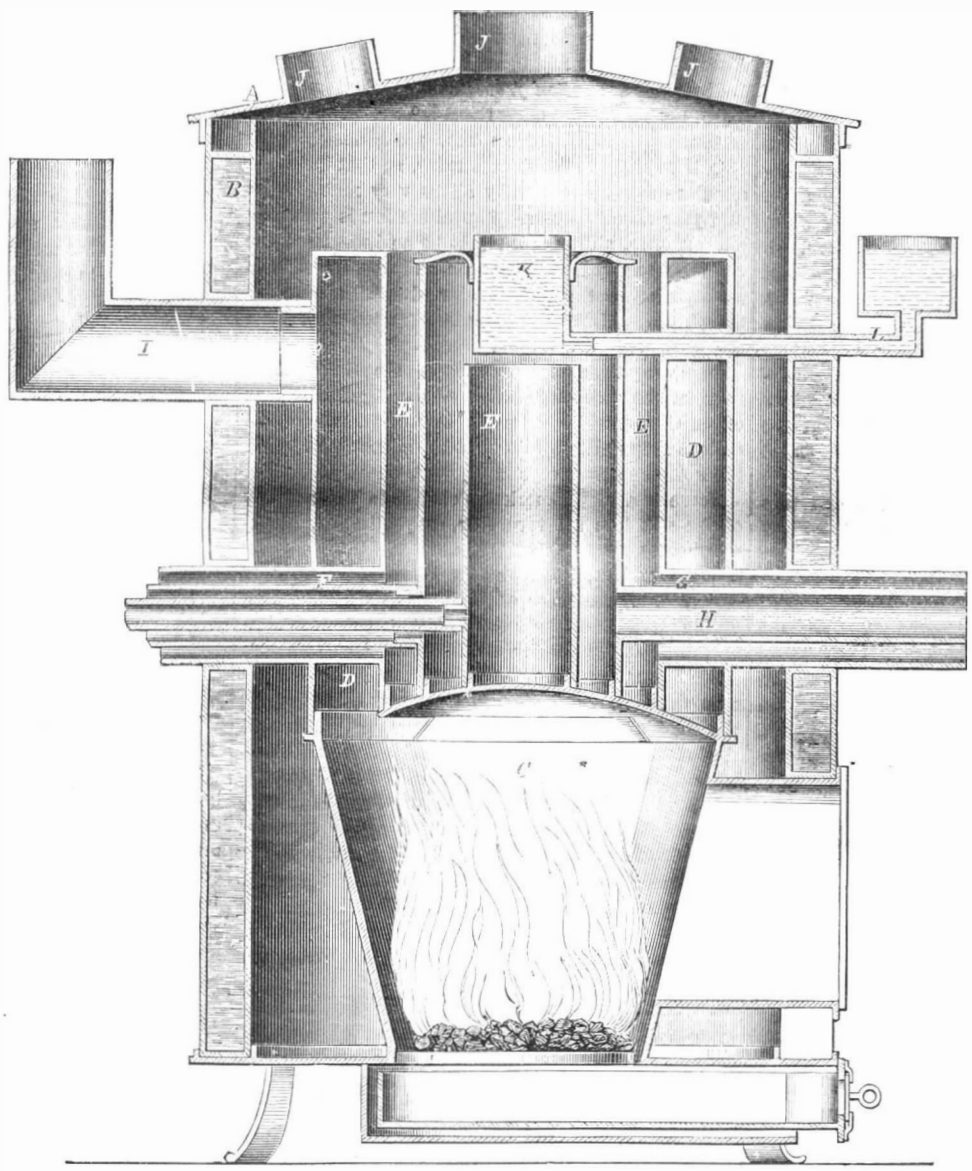
It is a well known fact to all who have given attention to economy in burning fuel that it is used to great disadvantage in ordinary stoves and ranges. In cooking stoves particularly the spaces are so cramped and the passages so contracted that the products of combustion, smoke and gas, completely choke them, so that all the draft that can be obtained is required to have an energetic fire.

A great deal of attention can be profitably bestowed on the common cooking stoves, for they are by no means economical, or so efficient, as they should be for the coal consumed.

The furnace here shown is intended for heating purposes. It is a moist hot-air furnace; so arranged that the air is charged with steam or moisture, as it passes into the apartments to be warmed, and deprived of the dryness which is so distressing to many and so apt to induce diseases of the throat.

In construction this furnace is simple. It is easily cleaned when foul, and requires no complicated array of dampers to render it effective. It is only necessary to build the fire and keep it burning, and the rest of the duty is done by the furnace itself.

In detail it is a structure, A, filled in with non-conducting material, B, so as to confine the heat in the center and prevent it from radiating. At the bottom of the furnace is the fire-pot, C, communicating with the combustion chamber, D, by segmental openings in its upper part. Above this fire-pot are the hot-air passages, E, surrounding one another and fitted with pipes, F G H, to convey cold air as fast as that already heated escapes.




DAYTON'S MOIST HOT-AIR FURNACE

The smoke-pipe is at I, and the hot air is distributed about the building from the openings, J.

A supply of water is maintained in the central vessel, K, through the tank and pipe, L. This being kept full continually insures the proper degree of moisture in the heated air. These are the principal parts.

This furnace seems to be very well designed for its purpose. The chamber wherein the products of combustion unite is large and roomy and is directly exposed to a high heat from the fire-pot crown. It is necessary that this should be so to insure ignition, or at least combustion of the smoke and gas. It should prove economical and efficient. A patent pending through the Scientific American Patent Agency. For further information address H. G. Dayton, Spencer House, Cincinnati, Ohio.

## DEVIATION OF THE COMPASS IN IRON SHIPS

At a meeting of the Royal Institution of Great Britain on the 9th of February a paper, by Archibald Smith, Esq., M.A., F.R.S., was read, "On the Deviation of the Compass in Iron Ships."

The deviation of the compass is a subject of great and increasing importance, owing to the great and increasing amount of iron used in the construction of vessels, and the consequent increase in the amount of the deviation and in the apparent irregularity of its laws.

On the present occasion it will be necessary for me to omit altogether some of the most important and most interesting parts of the subject, viz., first, the mathematical part, including algebraical formulæ, arithmetical processes, and graphic constructions of great interest and utility; and secondly, the numerical results for different ships and classes of ships which have been obtained from the reduction and discussion of observations made in a large number of ships in the Royal Navy. I must confine myself to an attempt to explain the principles on which the forces which cause the deviation act, and the principles on which the deviations produced can be reduced to law, and to stating generally what has been accomplished, and what remains to be accomplished.

*General Considerations.*—1. A magnet is a bar of steel, the ends of which have opposite properties; they are generally marked N. and S. (north and south), but to avoid the confusion which would be occasioned by speaking of the magnetism of the north end of the needle or of the north end of the earth as south magnetism, it is convenient to distinguish them as red and blue (which may be remembered from R occurring in north and U occurring in south.)

The property is that the red end of one magnet attracts the blue end, and repels the red end of another magnet, and *vice versa*.

If we lay two magnets at a little distance in the same line with unlike poles turned to each other, and lay a soft iron rod in the interval between them, the soft iron rod will be magnetized by induction; the end next the blue pole of one magnet will become red, the end next the red end of the other magnet will become blue. If we turn the rod about its center, it will gradually lose its magnetism, till, when at right angles to the line of magnetization, it will be neutral, and if we turn it further, it will become magnetized in the opposite way.

The earth is a magnet, having a blue pole in latitude 70° N., long. 96° W., and a red pole in lat. 75° S., and long. 154° E. The direction of the magnetic force in London at present is the same as if there were a blue pole 20½° to the west of north, and 68° below the horizon, and a red pole 20½° to the east of south, and 68° above the horizon. This direction is called the line of force, or the line of "dip." If we hold a soft iron rod in the line of dip, it becomes instantly magnetized, the north or lower end becoming red, the south or upper end becoming blue. If we hold the rod vertically, the lower end will still be red, but of less intensity, the upper end blue, also of less intensity. If we hold the rod horizontally north and south, the north end will be red, but of still lower intensity. If we now turn the rod in the same horizontal plane, its magnetism will diminish till it becomes east and west, when it will be neutral, and if we turn it still further, the magnetism will be reversed; the amount

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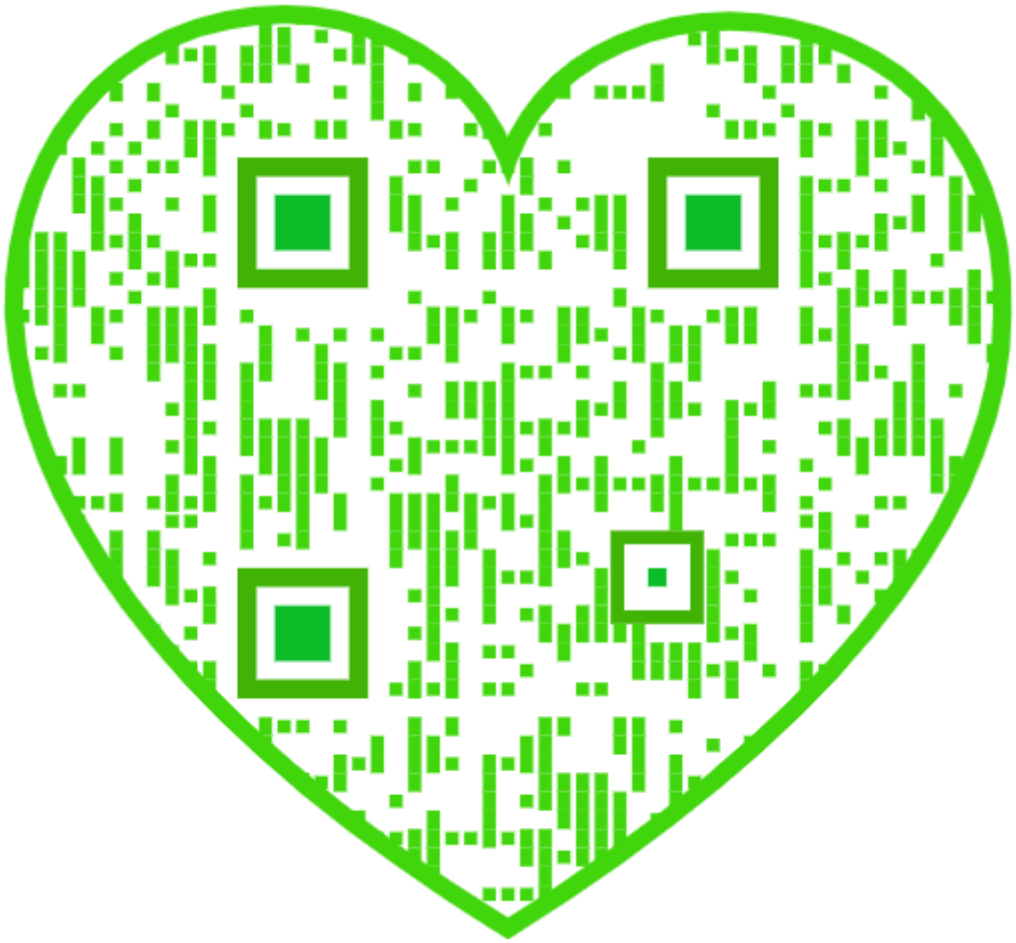

of the changes will be greatly increased by hammering the rod in each position. In a rod which I used, the effect was increased by hammering from 12 to 80, or between six and seven-fold. If the iron had been perfectly soft it results from the experiments of Weber and Thalen that the effect would have been about 36.

A sphere of soft iron will be magnetized in the same way however held. The diameter in the line of dip will be the axis of magnetism, and the lower and north half of the surface will be red, the upper and south half blue.

In bodies of any other shape the effect will be similar, though less regular, if the shape be irregular.

In an iron ship, on the stocks, intense magnetism is developed by the process of hammering; red magnetism being developed in the part of the ship which is below and toward the north, and blue magnetism in the part which is above and toward the south.

As the usual position of the compass is near the stern, it follows that in the case of ships built head north, the compass is in a position where there is an intense blue magnetism drawing the north end of the compass strongly to the stern and downward, and generally producing a very large deviation, besides a large heeling error. In such ships it is of importance to have a standard compass well forward.

In ships built head south, there will generally be less deviation and little heeling error in the usual position of the compass.

In ships built east and west, the amount of deviation is generally small, but is less regular than in ships built head south.

*Theoretical Representation of the Deviation.*—If we place a magnet before the compass with its blue end turned to the compass, it will draw the north end of the needle to the ship's head, and as the ship turns round, there will be, in the first or eastern semicircle, a deviation of the north point of the compass to the right hand or east, in the second or western semicircle, a deviation to the left hand or west. This would produce one part of what is called the "semicircular" deviation.

The effect of the two magnets and the one iron rod, which we have considered, make up the whole of what is called the "semicircular" deviation.

If we place a soft iron rod vertically in front of the compass, with its upper end at the level of the compass, this end, which will be blue, will attract the north end of the needle, and produce a deviation of exactly the same kind as the magnet which we have considered. It will, therefore, simply increase the semicircular deviation caused by the first magnet. If the red end of the imaginary magnet, or the lower end of the imaginary rod, be nearest the compass, or if the magnet or rod be abaft the compass, an effect of the same kind, but in an opposite direction, will be produced.

A magnet to starboard or port of the compass will produce a similar effect, except that a deviation of one kind will be produced when the ship's head is on the north semicircle, and of the other kind when on the south semicircle. This is the other part of the "semicircular" deviation.

If we lay a horizontal soft iron rod in front of and directed to the compass, it will easily be seen that when the ship's head is N. S. E. or W. it produces no deviation. When N. E. and S. W. it produces a deviation to the right hand or E. and when S. E. or N. W. a deviation to the left hand or W.; it therefore produces what is called the "quadrantal" deviation.

A horizontal soft iron rod directed to the compass, but placed to the starboard or port, will produce an effect of exactly the opposite kind, and would correct that produced by the first rod; but if the second rod, instead of being on one side, passes, as it were, through the compass, it will produce exactly the same effect as the first rod. The two rods will then conspire to produce the quadrantal deviation.

A quadrantal deviation of the same kind will be produced if the first rod instead of being on one side of the compass passes through it, provided always that its force is less than that of the transverse rod.

The magnets and soft iron rods we have imagined must not be considered as mere possible cases, but as representing truly the actual case in all ships. They are, in fact, the physical interpretation of Poisson's general formulæ for the action of induced magnetism, which interpreted amount to this—that the effect of the iron of any body, however irregular, on a magnetic particle, is exactly the same as that of nine soft iron rods and three magnets. When the iron is symmetrically distributed, as in a ship, the rods are reduced five in number, viz., the four we have considered, and the fifth lying fore and aft, with one below the compass, which would make the heeling error greater or less with the ship's head north than it is with the ship's head south, but this is not an effect of much importance.

*Effect in Particular Ships.*—In wooden ships the semicircular deviation is represented by the effect of a single vertical rod of soft iron in front of the compass, and the quadrantal deviation is very small.

In iron ships the semicircular deviation is generally represented by the effect of a magnet at the part of the ship which was south in building, with its blue end turned to the compass.

Armor-plated ships are generally plated after launching; the semicircular magnetism is greatly affected by the position in which they are plated. If they are plated in the direction opposite to that in which they are built, the deviation is generally diminished; when they are built, the semicircular deviation is generally increased.

*Change of Deviation from Time.*—What we have called the permanent magnetism is in truth only subpermanent, and changes much, particularly if the ship is exposed to blows or strains, so that the semicircular deviation generally alters very much in the first year after building. The alteration is generally a diminution, although it might be an increase if the compass had by accident or choice been placed in a position where the semicircular deviation from induced magnetism exactly counteracted that from the permanent magnetism.

In consequence of this change the Government has, on the recommendation of the Superintendent of the Compass Department, laid down a rule that no iron ship shall be taken up as a transport till it has made one long voyage.

There is a very remarkable change in the capacity of the soft iron for receiving magnetism by induction, which seems to indicate some molecular change in the iron, viz., that it becomes less susceptible of induction by the lapse of time. The effect of this on the strength of the iron is one of the most important points to which attention is now directed.

*Change of Deviation from Change of Place.*—When a ship sailing south reaches the magnetic equator, the earth's magnetism acts horizontally. The vertical soft iron rod which I have imagined will then have no magnetism, and the semicircular deviation arising therefrom will disappear. When she goes into south magnetic latitudes, the upper end will now become red, and will repel the north end of the needle, and change the direction of the semicircular magnetism caused by the rod.

There will be no corresponding change in the semicircular magnetism caused by the permanent magnetism, except that near the magnetic equator the directive force of the earth's magnetism being greater than in England, the amount of deviation which the same disturbing force produces will be proportionately diminished.

Careful observations on the changes which take place in the deviation of iron ships in different latitudes are much wanted. They are being made in some of Her Majesty's ships now in the South, but there are no means of procuring such observations from merchant ships.

No change is produced in the quadrantal deviation by a change of the ship's geographical position.

*Effects of Special Arrangements of Iron.*—The upper or lower ends of all vertical masses of iron produce powerful effects on the needle.

The stern post, iron stanchions, funnels, gun turrets, generally produce large deviations, but if the place of the compass is judiciously selected, they or some of them may be used as correctors.

Horizontal masses of iron, such as deck-beams, produce a great effect, generally increasing the quadrantal deviation and diminishing the directive force. Both causes of error may be reduced by having as little iron as possible immediately below the compass, or within a cone traced out by a line passing through the compass, and making an angle of 54° 45 with the vertical.

DESIDERATA.

I. *Royal Navy.*—The only desiderata seem to be that greater attention should be paid to the preparing a place for the standard compass, and to the position of the ship in building and plating. The position of the standard compass should be shown in the drawings of every ship, which, before being finally settled, should be submitted for the observations and suggestions of the Superintendent of the Compass Department.

Ships should be built as much as possible head south, and should be plated in the opposite direction to that of the building.

Careful recommendation as to the special points to be attended to have been submitted to the Admiralty by the present Superintendent of the Compass Department, and we may hope that much benefit will be derived from them.

A proof of what may be effected in this way, has already been given in the case of several of the ships of the Imperial Russian Navy, in which the arrangements made under the superintendence of Captain Belavenetz have greatly reduced the amount of deviation.

II. *Mercantile Marine.*—This is a more difficult question, from the want of any general superintendence, or any mode of establishing a uniform system, or any opportunity of receiving, recording, reducing, and discussing the observations made.

Till some change takes place in this respect, it is not probable that much improvement will be introduced, or that merchant ships will make their due contributions to the advancement of science.

What seems desirable is—

1. That in all iron steam passenger ships there should be a standard compass distinct from the steering compass, placed in a position selected from the small and uniform amount of the deviation at and around it.

2. That the deviations by the standard compass should be ascertained and returned to a department of the Government.

3. That these deviations should be carefully recorded, reduced, and discussed by a competent superintendent.

Many indirect advantages might be expected to flow from following, in these respects, the example of the Royal Navy.

## THE ATLANTIC TELEGRAPH---MEETING OF THE NEW COMPANY.

The Anglo-American Telegraph Company has been established for the purpose of executing, in the course of the present year, the enterprise of laying a submarine cable between Ireland and Newfoundland, so as to connect telegraphically the Old World and the New, and to raise the cable partially laid last year in order to complete a second line to America. An important meeting was held on the 14th of March, in the Common Hall, Hackin's hey, Liverpool, for the purpose of having the prospects of the undertaking fully explained. It was very numerously attended by some of the leading ship owners and merchants of the town, and by the representatives of the various telegraph companies.

STATEMENT OF THE ELECTRICIAN.

Mr. Varley, electrician to the company, made a long statement, from which we extract the most interesting portions. He said that Prof. Wm. Thomson, professor of natural philosophy at the University of Glasgow, who was second to none in mathematical engineering, had gone very carefully into the question relating to the effect of the water upon the operation of laying and recovering cables. And from the fact that the strain on the cable was only fourteen hundred weight during the operation of paying out, he was enabled to calculate precisely what was the action of the water during the operation of submersion; and he had found that the cable from the ship, owing to its light specific gravity, and the resistance which it experienced in passing through the water, sank so slowly that the cable from the stern of the vessel to where it touched the ground followed an incline extending over a distance of no less than seventeen miles from the stern of the vessel; in other

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words the cable was nearly three hours in going to the bottom of the water. From that he had calculated what would be the amount of friction in lifting the cable through the water from the bottom. The cable was paid out at the rate of six knots an hour and the operation of receiving would not be performed at a greater rate than one knot an hour, and at this latter speed the friction upon the cable from the bottom—a distance of two miles—the weight of the cable would be about 28 cwt., making a total of about 30 cwt.; and, as the breaking strain of the cable was 7 tuns 15 cwt., it would at once be seen that there was a large margin of strength. The new cable was found to lift a tun more weight than the old one. This would lift over 8 tuns without any fear, and, in addition, this cable instead of being 34 cwt. to the knot was only 31 cwt. Captain Anderson and Mr. Canning made a suggestion last autumn, which had been acted upon, which was of the utmost moment coupled with the fact which Prof. Thomson has brought to light, that the cable was 17 miles behind the ship before it reached the bottom. Their suggestion was this, that should anything happen to the cable the ship would be stopped, and the picking up would instantly commence; and should the fault be overboard, the paying out machinery could be reversed so that the cable could be picked up from the stern of the vessel without transferring the cable from the stern to the bow. That difficulty would be got over in the new machinery, and that great source of risk and delay entirely obviated.

PROSPECT OF RAISING THE OLD CABLE.

Mr. Gill said they had a great deal of this property at the present moment at the bottom of the Atlantic, and he would like to hear from Mr. Canning whether, if it was in a proper conducting electrical state, it could be used hereafter for a cable.

Mr. Canning would refer Mr. Gill to Mr. Varley. He could only say that from the tests they had read, the cable was in the same condition it was in when it was made.

Mr. Varley said since the cable was submerged it had been continually tested from Valentia, and it showed no change whatever. It insulated about four times as well as when it left the Medway in the *Great Eastern*.

Mr. Pickering asked if Mr. Canning would tell them if there was any chance of getting hold of the cable again?

Mr. Canning replied that he believed they would certainly get the cable again. When they unfortunately lost the end on the 22d August last, they all naturally thought it had gone from them for ever. They were not, however, to be beaten by such a thought as that; and although they had not appliances at the time sufficient for grappling and bringing to the bight of the cable from a depth of 2,000 fathoms, they had sufficient buoy rope to buoy it up, and it obliged to leave the buoys from stress of weather they could find these again. After a consultation upon grappling for it, they had no difficulty in finding the cable, and in hooking. In their very first attempt they met with the greatest success; and although they had at first great doubts about ever knowing when they hooked the cable, from the weight of the *Great Eastern*, the great depth of water, and their cable only bearing the weight of seven tuns, they thought they should not have the knowledge indicated on board when the cable was hooked. To their great supprise, when they came to the cable, the *Great Eastern* began to swing round to it, and there was no doubt they had hooked something at the bottom. (Hear, hear). They commenced lifting seven hundred fathoms from the bottom, when the swivel parted with it. Now, it was an indicated fact that they lifted the cable seven hundred fathoms from the bottom of the Atlantic; and he said if they could lift it through a space of seven hundred fathoms there was no doubt whatever that with stronger ropes and power of machinery for lifting they could get the cable of 1865 again, and put it in good working order during the ensuing summer. (Hear, hear). It was only a question of strength of materials for lifting the cable. (Hear, hear). They would have three good ships for cutting grapnels and holding grapnels, so that they could buoy and lift the cable in three parts.

Mr. C. E. Rawlins, Jr., remarked that there were certain buoys laid for marking the places where the cable was lost. Were these buoys in existence?

Mr. Canning replied that the buoys were moored quite as a temporary means, but he thought they were floating about.

Mr. C. E. Rawlins, Jr., asked if Mr. Canning was perfectly certain he could go to the place where the cable was lost.

Captain Anderson said the real object of the buoys was not so much to mark the place where the ship was at the time the cable was lost as where it was drifting. It was just as easy to find the end of the cable as it was to sail to Sandy Hook or Cape Clear. It was a matter of common nautical astronomy. (Hear, hear).

Mr. Varley said in the attempt to grapple the cable on the last occasion, they were near to the end of the cable in order to save it; but supposing any difficulty was experienced in that depth of water, they had only to run into 500 fathoms shallower water, so that it would be unnecessary to grapple two miles deep. He firmly believed that no difficulty would be experienced in getting at it from that depth, but if there should, they could run nearer to Ireland. (Hear, hear).

Mr. King—Would there be more risk in underrunning it than bringing it up?

Mr. Canning said that if they could only get the bight they would splice on a run to America. He would not think for a moment of stopping the expedition to complete the cable; he would leave another ship besides the *Great Eastern*, which would be with them to do that work. (Hear, hear).

THE WAY THE OLD CABLE IS TO BE RAISED.

At a meeting in Manchester on March 15th, the Chairman asked what means would be taken for the recovery of the old cable.

Mr. Canning said that after laying the cable of 1866 they would return to pick up the cable of 1865. Three ships would be used, the *Great Eastern* and another, which would be a chartered vessel, and a government ship fitted out with machinery for hauling up, the same as the other vessels. In lifting, the ships would be grappling at the same time at certain intervals apart, from two to three miles. The one to the west would put the greatest strain upon the cable, while the other two ships gently lifted it to the surface. The rope employed would bear a breaking strain of twenty-nine to thirty tuns; the swivels would be tested up to twenty-five tuns, and the grapnels would be tested up to the same; and therefore, he thought, with this strain, they would have an ample margin of strength. If the western ship, by hauling, should part the cable, there would then be other two ships with the bight on their grapnels, and by so doing, if the western ship should part it, that would materially lessen the strain upon the middle ship and also on the one to the eastward. If the ship to the west did not break it, and they wished to make an end, they could always do that by using the cutting or jamb grapnel which would so damage the cable by the strain put on it that it would break it and make an end. They could also adopt another mode—by lifting the cable up to a certain extent, and then buoying it, going further again, so as to get up the greater length from the ground, and get more slack, for the purpose of lessening the strain upon the cable. He thought that by these modes there was no doubt that they would be successful in recovering the lost cable. Mr. Fairbairn had gone into the calculations and agreed with him in every respect.

The Chairman said he had some doubts some time ago, but Captain Anderson had so explained the principle he intended to act upon with regard to the recovery of the cable that he had no doubt, if it was done with care, so as not to throw any severe strain upon the cable, instead of having one new cable in operation they would shortly have two cables.

Mr. Canning said he thought the fact that the directors of the Telegraph Construction and Maintenance Company had subscribed as much money as £100,000 toward this new attempt, proved the great confidence which they had in its success. Besides this, eight of these gentlemen had each subscribed £10,000 to the new company, and Mr. Cyrus Field had taken a like amount of stock in the new company.

WILL THE TELEGRAPH PAY?

At the Manchester meeting, Mr. Varley, the electrician, said, it was a significant fact that they had no instance on record of a cable that has been properly laid failing in deep water—all the failures had been in shallow water, or were due to faults that had existed in the cable prior to its being laid. There was no reason to fear, if this cable were properly laid, that it would fail for fifty or a hundred years, because the heavy shore ends would reach into deep water of one hundred fathoms. The question of success had been spoken to by Captain Anderson, Mr. Canning and Mr. Field. Therefore he would at once pass to the question of remuneration. It was at first proposed that only five shillings a word should be charged for the transmission of messages to America. But at the present moment there are thirty-one electric wires working between Europe and Great Britain, which were somewhere about half full—say about fifteen wires working continuously. What, then, would be the effect of one single wire connecting not only Great Britain and Europe, but Africa and Asia, with that tremendous telegraph system which had grown up in America and Canada? It was perfectly clear that one wire could in no way cope with the amount of work that would pass between the two countries, unless a high rate were charged to keep down the traffic. In the first instance, the government offered a subsidy to the Atlantic Telegraph Company of eight per cent. so long as the cable worked, and nothing the moment it stopped. That subsidy was useless, because if the cable worked at all it would earn a vast deal more than eight per cent. The government wished to limit the price to 2s 6d a word. The consequence would have been so enormous an influx of messages that before the second day's messages could be transmitted to New York the mail packet would have arrived there. (Mr. Field—That agreement is now cancelled). There was only one legitimate way in which they could limit the traffic, and that was to augment the price. The line from San Francisco to New York, which was a very costly line, passing twice up into perpetual snow and down again, charged for a message of ten words somewhere about £3, and had paid, ever since it had been in operation, from ninety to considerably over one hundred per cent per annum on the original cost. The Persian Gulf line, badly managed as the feeders to it were, paid £95,000 a year. The Malta and Alexandria line took £100,000 a year simply between Egypt and Europe. If, then, one Atlantic cable took no more messages than the Malta and Alexandria line, or the Persian Gulf line, and charged only six times the rate charged by those lines, their receipts would amount to over half a million. He had been watching the progress of telegraphy for the last nineteen years, and he was certain that the demand upon their line would be much greater than that. He did not believe that less than 20s per word would keep their line free for the first twelve months; and after the first twelve months a higher rate still would be necessary in order to limit the traffic sufficiently. He thought £1,000,000 per annum was a very moderate estimate of the earnings of the cable.

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THE extremely thin sheets of iron which may now be obtained, some of them weighing no more than 0·36 gr. per square inch, and being not more than the 4,800th of an inch in thickness, have been noticed as possessing to an extraordinary degree the power of resisting oxidation. This is doubtless attributable to a fused layer of magnetic oxide, with which they are always covered; and the fact has been applied to the protection of articles of wrought iron. The latter are embedded in a pulverized layer of native oxide of iron—hematite, for instance—and kept at a full red heat for several hours, after which they are allowed to cool gradually. Plates treated in this way are perfectly covered with the oxide, and are well suited for ship-building. A combination of the oxides of zinc and iron, formed by the use of oxide of zinc also gives rise to a black coating, which is, perhaps, even more effective.

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THE barque *Truelove* is a ship of the old school, recently sailed from Hull, England, being the only vessel dispatched this year from Hull to the Davis Straits whale fisheries. The *Truelove* is one of the oldest vessels afloat. She was built in Philadelphia, in the year 1764, and is consequently 102 years old.

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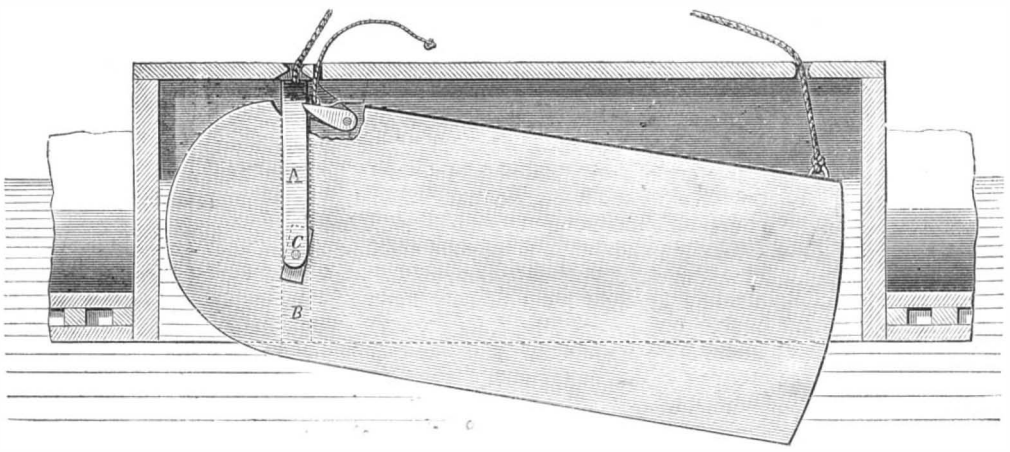
### Improved Center-board.

The subject of this invention is a new method of hanging center boards used on small vessels. By an improved method of hanging them the vessel is controlled with much more ease and certainty on rough water and may be run in shallower water than with the old style of board.

The inventor provides a yoke, A, which slides in a groove in the casing, B, straddles the center-board and is confined by a bolt, C. The usual tackle is fastened to the upper end of this yoke and another line to the rear of the board. It is easy to see, therefore, that by lowering either one or the other of these lines, or both at the same time, a greater or less amount of the center-board surface will be below the vessel, and that it is capable of being placed on line with the heel when desirable. These fixtures can be applied to boards now in use, and any change may be made in the shape of the upper end of the yoke so as to use different kinds of tackle, according to the weight and size of the board.




HALL'S CENTER-BOARD.

A patent was obtained on this invention through the Scientific American Patent Agency on Feb. 20, 1866, by J. F. Hall, of Westerly, R. I., whom address for further information.

### Periodic Phenomena.

Considerable interest attaches to what may be termed the "periodic phenomena" of nature. Of such a character are the appearance and disappearance of animals, as bats and badgers, which conceal themselves during the winter, and pass through a period of hibernation; the change of dress at different seasons by the ermine, the stoat, and their allies; the coming and going of the regular winter or summer migratory birds; the retirement and hibernation of reptiles; the movements of certain fish up and down stream for the purpose of spawning; the appearance, transformations, and disappearance of insects; the leafing of trees; the flowering of plants; the ripening of seeds; the fall of leaves—all these, and more, are worthy of the attention of the lover of nature, and not beneath the dignity of man. Linnæus constructed for himself a floral clock, in which the periods of time were indicated by the opening or closing of certain flowers. Gilbert White, and others since his time, not disdaining to be his disciples in such a work, constructed a calendar, of which periodic phenomena presented themselves to their notice. Humboldt observes of the insects of the tropics, that they everywhere follow a certain standard in the periods at which they alternately arrive and disappear. At fixed and invariable hours, in the same season, and the same latitude, the air is peopled with new inhabitants; and in a zone where the barometer becomes a clock (by the extreme regularity of the horary variations of the atmospheric pressure) where everything proceeds with such admirable regularity, we might guess blindfold the hour of the day or night by the hum of the insects, and by their stings, the pain of which differs according to the nature of the poison that each insect deposits in the wound. And the Rev. Leonard Jenyns, the naturalist, remarks:—"If an observant naturalist, who had been long shut in darkness and solitude, without any measure of time, were suddenly brought blindfolded into the open fields and woods, he might gather with considerable accuracy from the various notes and noises which struck his ears, what the exact period of the year might be.

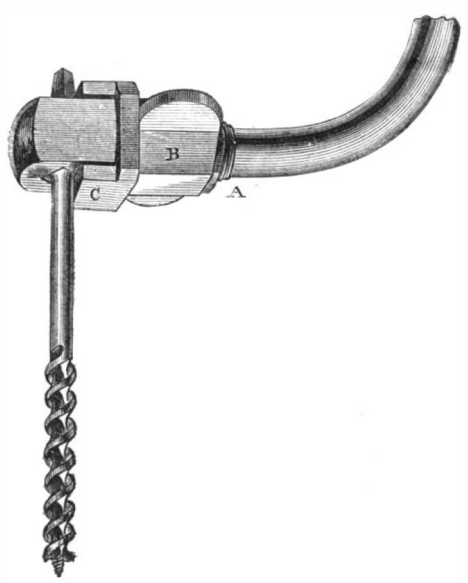
All such observation as we have alluded to are easily made and as easily recorded, and of all, none are of more interest than the migratory movements of birds. We know that some visit us in the spring and abide during the summer; others direct their flight hither late in the autumn, and spend with us their winter. But why this change, whence do they come, and whither do they go? We can partly answer this question, but only partially. We may declare, in general terms, that self-preservation and the perpetuation of the species, is the great moving cause. That the journey is undertaken in search of food, or a milder climate, or both, as a consequence the former of the latter, or in search of suitable conditions for rearing their young; yet there are many special circumstances in which this answer is inapplicable or insufficient."

Knapp, in his "Journal of a Naturalist," remarks of the willow wren:—"It is a difficult matter satisfactorily to comprehend the object of these birds in quitting another region, and passing into our island. These little creatures, whose food is solely insects, could assuredly find a sufficient supply of such diet during the summer months in the woods and thickets of those mild regions where they passed the season of winter, and every bank and unfrequented wild would furnish a secure asylum for them and their offspring during the period of incubation. The passage to our shores is a long and dangerous one, and some imperative motive for it must exist; and, until facts manifest the reason, we may, perhaps, without injury to the cause of research, conjecture for what object these perilous transits are made."

The record of periodic phenomena made in the same district over a series of years is always of interest; but contemporaneous records made at numerous stations distant from each other, and in which the same kind of observations are made, would be of more interest still. Take, for instance, the first appearance of a swift for ten successive years in twenty stations between the Isle of Wight and Caithness; or the last note of the cuckoo heard between the Land's End and the Tweed. Many such trifles, apparently insignificant in themselves, become of importance when carefully and faithfully recorded, and such a work may be accomplished by those who make no pretensions to be men of science, but are content to call themselves "lovers of nature."
—*Scientific Gossip.*

### GORDON'S BIT FASTENING.

Every trade has some special annoyance or vexation appertaining to it which tries the temper and delays the workman, and we are sure that many can bear witness to one trial carpenters and joiners have to bear; that is, when withdrawing a bit from a hole just bored, to have it part company with the brace and fall out. This does not matter much where there is but one hole to be made but when there are many the evil is a serious one.




The reader will see in this engraving a remedy for it. The shank of the brace is provided with a screw thread, A, and nut, B. This nut, when screwed up, forces a jaw, C, up to the protruding end of the bit, and also against the body of it below, so that it is firmly held in place beyond the possibility of accidental detachment.

Besides the sense of security thus given, the bit bores better and straighter. Sometimes the shanks of the bits do not fit the squared socket in the brace, and they wabble about. With this fastening any bit can be securely held.

Patented through the Scientific American Patent Agency on Jan. 16, 1866, by J. P. Gordon, whom address at West Garland, Me., for further information.

### POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

#### INFLUENCE OF INVENTIONS ON CIVILIZATION.

Dr. R. P. Stevens read a long paper on the "Influence of Inventions on Civilization." The paper was mostly made up of statements of facts showing the wonderful effect of different inventions in increasing the rewards of labor and improving the condition of mankind. The most impressive of these statements was one made to illustrate the effect of railroads. "When Queen Elizabeth moved her court, 24,000 horses were called into requisition, and the consumption of provisions was sufficient to support 190,000 men. The royal progress was more dreaded than the march of an invading army, and the region through which it passed was reduced to famine from which it required years to recover. When Queen Victoria visits Scotland, she is carried in a special train at an expense of about $5,000."

#### EXPERIMENT TO ILLUSTRATE THE ACTION OF WATER IN BOILERS.

Mr. Norman Wiard presented an apparatus to illustrate the sudden rise and fall of water in steam boilers. He had a cylindrical glass beaker, about four inches in diameter and twelve inches in hight, divided by ten tin diaphragms half an inch apart. The lower diaphragm had an inch hole through the center, and the one next above four half-inch holes near the periphery, and all the diaphragms were punched in the same alternate manner, about one-seventh of the area being removed. The object of these diaphragms was to obstruct the escape of bubbles of steam which were formed at the bottom of the beaker. The vessel was filled with water to a level with the diaphragm next to the upper one, and the water was made to boil by a spirit lamp under the beaker. So soon as ebullition commenced, the surface of the water rose about an inch and a half; the action being manifestly due to an increase of volume by so large a portion of the space being occupied by bubbles of steam. On injecting a very little cold water, which was led by a pipe to the bottom of the beaker, the boiling was stopped, bubbles of steam ceased to be formed, and the surface of the water instantly fell to its first level.

The experiment was designed to illustrate the cause of the sudden fall of water in boilers on the cessation of ebullition—a phenomenon that has been frequently observed by engineers, especially in boilers having narrow water spaces, where the free rise of bubbles of steam to the surface is obstructed. The boiling may be stopped either by opening the furnace doors, or by starting the feed pump, or by closing the safety valve.

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STREET RAILROADS.

The regular subject of the evening was "Means of transit between different parts of New York City," but the discussion consisted principally of expressions of individual opinion in regard to the various schemes which have been elaborately described in our columns. The weight of opinion seemed to be in favor of a road built in an open, dry canal, just deep enough to run the cars below bridges laid at the surface, and passing through the middle of the block west of Fourth Avenue and Broadway. It was suggested that there might also be a similar road on the east of Broadway.

PROFESSOR JOY ON CROWDED CARS.

Professor Charles Joy, of Columbia College, remarked that the engineering problems involved were not in the line of his studies or of his knowledge, but the social or humanitarian side of the question, which had been broached, was of interest to every citizen. He wondered that the people of New York city did not rise in their majesty and put an end to the abuses of our horse-railroad system. He had traveled during the last year 6,000 miles in Europe —just 6,000. Five hundred of this was by other means than steam, 5,500 by steam. He had rode in first, second, third, and fourth class cars, he had traveled under ground and above ground, on water and land, and he had never experienced discomfort which approached that to which he had been subjected that evening in coming down from Forty-ninth street to the Cooper Institute. He had come directly from his laboratory, but he never had in his laboratory odors so vile—his science was not able to produce so foul a compound of stenches as filled the car in which he rode. If the railroad companies treat us thus above ground, what will they do when they get us into subterranean tunnels? He thought that the principal care of the citizens should be to see that, in the granting of franchises, ample provision is made for the protection of the community from imposition.

## THE CURRENCY DELUSION.

Money continues to get closer as our government contracts the currency. By drawing off the currency the common people are oppressed, and the interest of the money lender is enhanced. In creating the interest-bearing United States bonds was legislation enough in favor of the capitalists for one generation.

If forty-five years' experience in mercantile, manufacturing and farming business has taught me anything, it is that men prosper best when money is most plenty; and always run down, become poor, or break down when money is scarce. In this I find but one exception, and that is the money lender. We need $1,100,000,000 of currency to do the business of the country this year, and as fast as the United States interest-bearing bonds fall due pay them also off in legal tenders, together with the premium on gold, if need be; and induce the capital now hoarded in bonds, by a suitable permanent protective tariff, to go into manufactures, and to developing the vast resources of our country. H. H. M.

Galesburg, Ill., March 20, 1866.

[It is a curious fact that while no one pretends to understand geometry, or chemistry, or geology, without a methodical mastery of the several problems in their natural order, most people suppose that they are masters of political economy without any study of it whatever

To give a complete answer to our correspondent it would be necessary to write a treatise on the science of political economy. In the limited space at our command we must content ourselves with reminding him that capital is not the same thing as money. The capital at interest in the country is twenty or thirty times greater than the amount of all the money in the country. Capital consists of horses, sheep, swine, corn, wheat, sugar, plows, steam engines, cloth, and all those forms of wealth which are employed in the production of more wealth. If we had $1,100,000,000 of currency in the country—if it was in the form of gold, we should send all but 200,000,000 of it abroad, and exchange it for iron, copper, tin, cordage, and other kinds of capital that would be more useful to us than an excess of currency; if it was in the form of paper notes, it would be worth not more than 20 cents in the dollar, and would go no further in accommodating any man with the kind of capital that he needs in his business than $200,000,000 of currency would. The use of currency is to effect the exchange of commodities, and the same dollar is used over a great many times; $100 of money may be employed in loaning $1,000, or $10,000 worth of capital. The rate of interest depends upon the supply of the aggregate capital in all its varied forms, in relation to the demand—not to the desire, but to the commercial demand—by those who not only desire more capital, but who are also able to give satisfactory security for its repayment. In the year 1850 the people of California had more money in proportion to the population than any other community ever had, but the aggregate capital was so small in proportion to the demand, that the regular rate of interest on perfect security was ten per cent a month.

The money of this country is not more than two or three per cent of our aggregate wealth, but it is a very important part, for it is the general measure of values, and therefore, an element in all pecuniary transactions. Every man in the community is interested in having this measure always of the same capacity. The fluctuations inseparable from an inflated paper currency are disastrous in a thousand ways—they impair the obligations of contracts, they rob the workman of his wages, they check the growth of our towns and cities, they infuse uncertainty and distrust into all business relations, and they materially diminish the production of wealth. The tendency of an inflation of the currency is to increase the difficulty of hiring money, and to raise the rate of interest on all ordinary securities.

The most disastrous measure that Congress ever adopted was the inflation of the currency, and every month's continuance of that inflation is costing the people of this country untold millions of dollars.

## Application of Electricity to Paddle Engines.

General the Count de Molin, an Italian nobleman, has constructed and patented a paddle engine, working by electricity, to be adapted to a small boat, christened *L'Electricite*, destined to ply on the large lake of the Bois de Boulogne. The working parts are thus composed:—There are two upright hoops, about two feet and six inches in diameter, placed three inches apart, in the periphery of each of which are encased sixteen electro-magnets, placed opposite each other. Between these there is another hoop or wheel, of soft iron, of the same diameter as the others, and so articulated as to receive, when alternately attracted by the magnets at each side in succession, a sort of rolling from side to side, or "waddling" motion. To this wheel is fixed an axis about seven feet long, which constitutes the prime moving shaft of the machine. When the wheel between the magnets takes its rolling motion it causes the ends of this axis to describe circles; one end turns the crank of a fly wheel, while the other end is adapted to a framework, on the same principle as the pentagraph, which enlarges the motion received from the central disk, and communicates it in the form of a stroke by a connecting rod to a crank on the paddle shaft. This end of the moving bar also sets to work the distributors for alternately establishing and cutting off the electric communication between the magnets and the battery. There will be in all sixteen elements of Bunsen's. The force of the machine while at work with four elements was found to be one quarter man power, so that with sixteen cells the power will be about that of a man. The paddle wheels are two feet and six inches in diameter.

## The Iron Clad Monadnock.

The Navy Department has received intelligence of the arrival of the double-turreted iron-clad steamer *Monadnock* at Montevideo on the 17th of January, after a passage of five and a half days from Rio de Janeiro.

The average knots an hour run by the *Monadnock* was 7·37; the greatest distance run in 24 hours was 184·2; the least distance, 173·6.

The following is a detailed statement of the time under way, coal consumed, etc.:—

| | Days. | Hours. |
|---|---|---|
| Total time under way | 5 | 18 |
| | Tuns. cwt. | lbs. |
| Total amount of coal consumed | 168 17 | 67 |
| Average per day | 29 7 | 16 |
| | Starboard | Port |
| Total revolutions of engines | 519,367 | 522,093 |
| Average per minute | 62·7 | 63 |
| Greatest number per minute | 66 | 66 |

SAW manufacturers will find it profitable to advertise in the SCIENTIFIC AMERICAN constantly. Our readers are frequently writing to us for the above articles.

## MISCELLANEOUS SUMMARY.

CURIOUS COUNTER-CURRENT IN LAKE ERIE.—The Cleveland *Herald*, of a recent date, notices a phenomenon in Lake Erie. Many persons gathered along the banks of the Cuyahoga river to see the water flowing toward the source whence it came, carrying with it logs, blocks, and other floating material. In the afternoon the river rose about two feet, being at its highest stage about four o'clock, when from some cause the water began to flow in an opposite direction from the lake. The wind was blowing a stiff breeze from the south, which makes the matter more singular.

THE consumption of coal, including waste, in the United Kingdom, amounts to three times the quantity expended in 1845. In the year 1845 the consumption in Great Britain, for domestic and all manufacturing purposes, was 31,800,000 tuns, and there were exported in the same year, 1,800,000 tuns. In 1865, however, there were consumed for domestic and all purposes of manufacture 87,000,000 tuns, 9,000,000 tuns being exported.

THE greatest pressure of wind ever registered at Glasgow Observatory, was 55 lb. per foot. Professor Airy, however, states that it may reach 80 lb. per foot in this country, while Mr. Scott Russell asserts that 40 lb. per foot is about the maximum force which it is necessary to reckon upon in constructing roofs, etc. This is identical with the maximum registered at Menai Bridge.—*Engineer.*

RECENT accounts from Leghorn state that there is a rise in the price of petroleum, of which the consumption is said to be so large in Italy that the supply is not equal to the demand. The price has so much increased lately that companies have been formed at Turin and Genoa for working and purifying the produce of the petroleum springs which exist in Parma and Calabria.

MAKERS of clothes-wringing machines will do well to advertise in the SCIENTIFIC AMERICAN. We have constant inquiries from all parts of the country. A short advertisement constantly published in our paper would doubtless prove profitable to the manufacturer and convenient to readers.

IT appears from a number of experiments that the bronze of which the ancients formed their weapons and other articles, was composed of 88 parts of copper to 12 parts of tin. It is remarkable that the same mixture has been employed by nations very remote from each other.

IN the year 1541 the deviation of the magnetic needle from the meridian at Paris, was found to be from seven to eight degrees to the east; in 1,550 from eight to nine degrees, and in 1,580 eleven degrees and a half to the east.

AN American student, Francis A. Channing, of Boston, has lately taken the Arnold prize at Oxford, Eng., for an English essay. The prize amounts to two hundred and ten dollars, and is open to all Oxford graduates of less than eight years' standing.

THE French ordnance committee have come to the conclusion, first, that breech-loaders are a mistake for large calibers; and that for rifled guns, throwing heavy shot, the Whitworth gun is the best. The only thing against it is its cost.

PUGET succeeded in adjusting the eye of a flea so that by the use of the microscope he was enabled to see objects through it. It multiplied and diminished every object. Thus a soldier appeared like an army of pigmies.

PATENT EXCHANGE.—We are requested to state that in consequence of the destruction by fire of building No. 229 Broadway, Mr. Orwig's patent sale exchange has been located at No. 111 Fulton street.

IT HAS been estimated that a tun and a-half of water falling one foot per minute, will grind and dress a bushel of wheat per hour.

IF hydrogen gas be breathed for a few moments it has the curious effect of changing the voice. The effect very soon disappears.

13,392 tuns of water are every day converted into steam and discharged into the air from locomotive engines alone in Great Britain.

AS MANY as 12,500 facets have been counted in the eye of a dragon-fly.

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## Notes and Queries

A., of Md.—Carbolic acid is composed of carbon, hydrogen, and oxygen with the formula according to the old atomic weights—

$$C_{12}\ H_6\ O_2.$$

which gives the proportion carbon 62 pounds, to hydrogen 6, and oxygen 16. It is one of the constituents of coal tar, and is separated first by fractional distillation, then by agitating the oil which comes over between 300 deg. and 400 deg. with a solution of potash, and saturating the watery portion with hydrochloric acid.

C. R. J., of N. Y.—The notion that there is any more power in a long screw driver than in a short one—the handles of the two being of the same size—is the result of careless observation.

E. K. C., of Me.—An index plate for a small gear cutter can be purchased in this city for about $12.

G., Ind.—Machinists' tools can be had in all tool stores.

H. O., of——.—Recipes for dressing furs cheaply and quickly, can be found on page 326 Vol. XI.

L. S. B., of S. C.—Your notion that the attraction of the earth is due to magnetism instead of gravitation would be overthrown by a consideration of some obvious facts—for instance of the fact that the earth attracts all bodies alike in proportion to their mass, while magnetism does not attract any two substances with the same force, and some it does not attract at all. If you try the experiment you will find that a coin weighs more than a feather in a vacuum.

A. & G. W., of Pa.—The officers of the Government usually express the amount of the public debt in figures, leaving readers to call the amount thousands of millions or billions, to suit their own fancy.

A. A. R., of Pa.—The picture that you send us is a wood cut printed from three blocks. One block is cut to print the blue, another to print the yellow, and a third the purple; and the paper is pressed successively on each block.

A. G. M., of Min. To get the circumference of a circle multiply it diameter by 3.1416. Multiply the circumference of a reel by its revolutions per minute, and you will have the length of line that it will wind in a minute.

D. R. T., of Va.—The sketch of the governor you send us is novel, but there are others so much better that we do not advise you to proceed with it. You will find directions for making artificial ivory on page 198 Vol. X.

H. B. S., of Pa.—We never heard that the injector had any effect whatever on the slide valve. Your question is so put that no other answer will apply to

H. R., of Ohio.—There is no cement that will hold vulcanized rubber to iron so that it will not come off.

G. S., of Pa.—If there is no pressure from below, you must calculate the pressure on the whole upper area of the valve. The address of the party you require is New York City.

W. F. S., of Md.—Your case is that of many others. You have an invention and wish to bring it before the public, but have no friends to whom you could confide the secret of it to introduce for you. Your only course is to take out a patent for it, when if it is really useful you will find plenty of persons who will buy it.

F. Olneyville, Box 129.—We have no idea what the question was that you sent us $1 for and that you only received "a three cent book for." If you will send your question again we will endeavor to answer it satisfactorily.

B. W. R., says:—"I am the manufacturer of a known chemical combination, but having made several improvements in it lately, have as yet taken no patent. Should I die could my heirs take a patent out for the same?"—Yes.

H. A. G., of N. Y.—The "shiny black paint" used on fancy iron castings, is japan varnish sold by all wholesale paint dealers. It is applied cold, and baked in an oven at a moderate heat for some hours.

T. R. N. Y.—You require to know whether the recipe for welding cast steel, recently published in the Scientific American, will unite wrought iron and steel. It seems that you might put a piece of each in your fire and try it, and so find out in the most satisfactory manner. No water must be added to sal ammoniac in melting it. It is the water of crystallization that is to be driven off.

B. & Co., Ohio.—In philosophical terms, a pulley on a vertical shaft rotates in a horizontal plane; in popular language it may said to run horizontally.

H. C. B., N. H.—Our information in regard to the state of the cabinet business in Iowa, is at present so limited that we could not advise you with any degree of accuracy.

Worcester Rule Co.—We have never had the pleasure of reading your pamphlet, but will give attention to any article you may forward us.

C. W., N. Y.—The eccentric on a horizontal engine is nearly at right angles with the crank; whatever the lap and lead is will change the angle that a line through the center of the eccentric forms with a line drawn through the center of the crank. If the engine runs backward, that is, toward the cylinder and the connection is direct from the eccentric to the valve stem, the eccentric will be on the upper side when the crank is on the forward center. Agents who sell our paper have no right to collect postage, they get their papers by express.

E. A. W., Ohio.—Green hide is generally applied as a cushion to receive the edges of knives in straw cutters. On paper cutters a piece of maple wood is used.

## Correspondence

### Machine Taps--Steam in Cemented Cisterns.

Messrs. Editors:—In a recent number of the Scientific American, "Apprentice" asks for some information about the best mode of filing taps. Your answer to him is correct, and agrees with my experience, as far as the filing of the flutes is concerned. I call the attention of your readers, however, to another very important point which is generally overlooked by mechanics making the taps.

Taps for use in machines are now made almost universally straight; that means, the part on which the thread is cut is turned of even diameter, and after the thread is chased, a portion of it is turned off tapering toward the end. To make a tap of this kind to cut free and without much heating, the tail stock of the lathe should be set to on side, enough to turn the tap on the end which enters the nut first, about 0 15 larger, then the required finished size of the other end of the thread; on large taps even ·02 is not too much.

Taps, particularly thin ones, will spring considerably in turning, and more so by chasing (unless a steady rest is used), which causes the tap to be of a larger diameter toward the left end of the thread. It is evident from the nature or curve of the thread, that the sides of the same cannot cut and present a smooth surface to the iron in contact with them. It is further evident that the friction on the sides causes the tap to expand, and also the nut; if the tap is larger toward the finishing part, the friction is greatly increased, and heating and breaking of the taps is generally the consequence. On the other hand, a tap made according to the above direction will always cut free and without perceptible heating. The tapered part forms a series of cutters, and none will cut more than its projection above another; the expansion of the nut will always correspond with the diminished size of the tap, so will the strain and power required for cutting as the width of the cutting edge decreases.

The taps in use at the place I have charge of, have all three semicircular flutes, the thread on the tapered-off portion is slightly filed off to the edge, to reduce the friction, and to allow the teeth to cut free, and not to squeeze Our 1·25 tap is 14 inches long, the thread part 4 inches, the tapered part 3 inches. The machine is not stopped for taking off nuts, the tap is simply taken out of the socket into which the shank is fitted. The shank is turned down to the bottom of the thread the whole length, which gives room for 7 nuts to remain on it. Our $\frac{3}{8}$ tap is 7 inches long, thread part 2 inches, tapered part 1·5. These taps have been used for five successive hours, without heating materially, if oil is regularly supplied. Such taps, if dull, can be sharpened up very easily on the grindstone.

In your "Notes and Queries" you express the wish of learning the result of exhausting steam into a cemented cistern. We have one at this place, into which the steam of a 65 horse-power engine is exhausted during winter only, for the last 10 years, and we never experienced any difficulty. Yet I am of opinion that it will injure the cistern sooner or later. Another very serious objection against this practice is, it keeps the water in constant agitation, and prevents the settling of its impurities, and as we draw our feed water from this cistern, dirt will be deposited in the boilers. There is one reason, however, why we continue to do it; rain water falling on all our large buildings in the yard is conducted through pipes into this cistern, and the hot steam keeps these pipes and conductors all the time open and prevents them from freezing in cold weather. The water gets very hot, particularly when the supply gets low, and under such circumstances we find it it very injurious to the packing of the feed-water pump. M. N.

Alleghany, Pa., March 22, 1866.

[We cannot agree with our correspondent about the feasibility of grinding taps. Few grindstones run true enough to do it properly, and few men, especially bolt cutters, have skill enough to grind a tap without some rest. It would pay in all machine shops to have a solid emery wheel of fine grade to sharpen special tools on, together with rests suited to different work.—Eds.

### Projectiles Used During the Crimean War

Messrs. Editors:—I take great pleasure in communicating to you the following extract from official documents in my possession, and which may be read with interest by your numerous readers:—

Number of projectiles used:—French, 29,460.363; English, 15,000,000; Piedmontese, 50,000; Turks, 50,000; Naval Forces (Allied), 35,000; Russian, 45,000,000. Total, 89,595,363.

Killed and wounded by these projectiles:—French, 50,836; English, 91,038; Piedmontese, 183; Turks, 1,000; Naval Forces (Allied), 2,000; Russian, 100-000. Total, 175,057. Lionel d'Epineuil.

Philadelphia, March 21, 1866.

[It will be seen that only one projectile in 512 did any execution.—Eds.

### A Crystalline Car Axle.

Messrs. Editors:—The accompanying metal, just as it is, was taken off a broken axle of a freight car on the Pittsburg and Erie R. R. on March 20, 1866. The axle was broken near the hub of the wheel and both parts had the same appearance. The yellow is not rust as there is no crack in the axle to let moisture in, and it is in the same condition as when I broke it off. Being a passenger train and being detained by this break is the manner in which I got it. Sizer & Co. was on the wheel, but nothing else, no location or any thing to know where it was made.

I may not be a judge of iron for car axles, but it seems to me this is very poor material.

G. M. M.

Oil City, Pa., March 26, 1866.

[The specimen is a mixture, in about equal proportions, of peroxide of iron and bright crystals of iron. It is manifestly very brittle, and wholly unfit for use as a car axle.—Eds.

### The Cascade of Light in Boston, Mass.

Messrs. Editors:—In remarking upon an article in your paper of the 24th inst., entitled "Light in a Bowl of Water," you say, "One of the most brilliant experiments ever exhibited in a lecture room, is the throwing of the electric light upon a column of falling water." Never was a remark more true, as all can testify who were so fortunate as to be present at Prof. Lovering's lecture in this city last Friday evening, before the Lowell Institute.

With the aid of a very powerful Rumkoff coil, a stream of falling water was made to produce, as you say, "precisely the effect of a cascade of light."

The object of this note is, with your permission, to say that, "this dazzling experiment has been exhibited" most successfully in this country as well as in England. J. A. D.

Boston, March 26, 1866.

### Electricity from Combing the Hair.

Messrs. Editors:—I would like very much to see explained in your interesting paper, the following fact that occurred to me some nights ago. While I was combing my hair, using an india-rubber comb, I remarked that every time that I passed the comb through my hair, there was a crackling noise like the explosion of sparks of electricity. Rather astonished at this, I put out the gas light, and effectively I perceived in the looking glass before me, the bright sparks shining and disappearing in the obscurity.

As I am not acquainted with the mysterious ways of electricity, I would feel obliged to you for an explanation. A Subscriber.

New York, March 30, 1866.

[A common phenomenon. Electricity is produced by friction, and one of the very best electrics is hard india rubber.—Eds.

### Strength of Ice.

Messrs. Editors:—Your statement in your last number, as to the strength of ice, is calculated to mislead, and any officer trusting to it in moving a body of men would be very apt to give them a cold bath. Two inches of good ice will bear a man, but not a number of men. In deep water it will always crack a little even with one man's weight, and would very soon be weakened. Four inches will scarcely bear a horse. You could not invent a more perfect ice breaker than a horse's sharp shoe. All his weight

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son two feet, and the sharp caulkers do not give one inch surface for it. Ice also is very different in its strength when formed in excessively cold weather; it is then flinty and brittle, cracks easily and requires some days of milder weather to make it bear well. This is one of the mysteries of the formation of ice. I have resided many years on Newburgh bay, and the matter of crossing it in winter either for business or pleasure is of some importance. Six inches of good ice is safe for a tun load on a sleigh, and for a few days safe for a wagon. A valuable team of horses was lost last winter with a load of 1,500 lbs. of coal on a wagon. The ice was six and one-half inches. A drove of cattle running too much together broke through ice measuring ten and one-fourth inches, in 1864. In very cold weather the water, where ice is formed, goes down to thirty-two and one-fourth degrees and is the same temperature at any depth. This year I have not seen it lower than thirty-two and one-half. When it rises to thirty-three the ice melts rapidly. Many years since a heavy gun was run over from West Point to Cold Spring, and the thickness of ice was published, I think, in the *Franklin Journal*. I have made many experiments on the ice and temperature of the water, and if interesting to your readers, will be pleased to give them to you. W. H. Denning.

Fishkill, N. Y., March 27, 1866.

[Definite information like this is always acceptable to us, and we are obliged to our correspondent. As the maximum density of water is 39·2°, we think it must be in exceptional cases only that it will be found at 32·25° at all depths.—Eds.

### The Cigar Steamer.

Messrs. Editors:—In No. 13, current volume, of the Scientific American, you comment upon the form of Winan's cigar steamer as follows:—"If the vessel was to be wholly submerged, the form would be excellent; but as she is to float at the surface, the submerged portion only will act upon the water, and it seems to us that the form of that portion is very badly calculated to overcome the resistance of the water."

May I trouble you for an answer to a question, relative to the same? If that form of hull is excellent when submerged, and subject to increased resistance from the water, why should it not be excellent when only half submerged with less resistance?

All aquatic fowls when swimming have an unequal immersion of body. No person will deny that their buoyancy is perfect, and speed very great, comparatively. R. B. S.

Sing Sing, N. Y., March 22, 1866.

[If the cigar steamer was cut in two at the surface of the water, is it not plain that the lower slice—the submerged portion—would have a form entirely different from that of the whole vessel? If this submerged portion had a square house built on it, or a cabin with vertical sides, or any other form of superstructure, its power, in a smooth sea, of overcoming the resistance of the water, would be just the same as with its present spindle-shaped upper works. The best form for pushing the water aside is a wedge with a vertical edge; and the sharper the wedge the better. In the cigar model the several wedges that make up the bow under water, have rounded ends, and they are not so acute in proportion to the relative length and width of the vessel as in ships of ordinary construction.—Eds.

### Cold Cast Iron on Melted Cast Iron.

Messrs. Editors:—I have noticed the question repeatedly, why cold cast iron will float in liquid or melted cast iron.

I tried one experiment on the same by taking probably a pound, filed it bright, and removed all the sand and scale, and it sank like a stone in water. Shrinkage is about an eighth of an inch per foot, consequently sand and scale is buoyant enough on small castings to float. Daniel Zuern.

Shamokin, Pa., March 28, 1866.

[Was not the piece of iron dropped from a considerable hight, so that the momentum carried it under, and did it not rise immediately to the surface? Dr. Parmelee, of this city, tried a piece weiging thirty pounds, made perfectly clean, and it floated. —Eds.

### Lottery and Gift Swindles.

Messrs. Editors:—Does it not become your duty, through your widely-circulating journal, to give the public warning against the fraud and deception now being perpetrated by a company or companies of lottery dealers in your city? Honest, hard-working, poor men are becoming the dupes of their nefarious swindling. The agents of these lottery managers send out their circulars and list of prizes to be drawn in their "scheme," to individuals whom they designate as chosen by them to aid in their enterprise, offering them a carefully selected package for ten dollars, and binding themselves to pay two thousand dollars to the individual should his prizes fail to draw that amount. Who would refuse so good an offer from responsible men doing an honest business? The writer has received such a circular and proposition, but has not yet sent the ten dollars. Shall I send?

Respectfully, J. C. R.

Grand Rapids, Mich., April 2, 1866.

[We answer, yes—send on your ten dollars. If you have not good sense enough to discover the cheat, after you have sent the ten dollars you will find out by experience what you may never learn from the advice of others.

We are constantly receiving inquiries similar to the above, and with a view to see what could be done to break up such frauds upon honest and unsuspecting people we called upon Mayor Hoffman, who assured us that he had done all in his power to suppress them, and had warned the public through the newspapers to take no notice of such circulars when received. In spite, however, of every effort these lottery and gift swindles still flourish, and always will flourish until people learn the common-sense fact that when an advertiser promises to return two dollars for one, he simply means to swindle. If people will be gulled by such transparent frauds, there is no hope of our enlightening them upon the subject. The carefully-selected package to which our correspondent refers as being offered for ten dollars, in all probability could be purchased for a dollar of any honest tradesman, of which class there are thousands in this city. But swindles take better with some people than honest dealing, there seems to be a sort of charm about these bogus operations.—Eds.

### A Sawyer Answered.

Messrs. Editors:—Having had some experience in making and running circular sawmills, I should answer the questions of "F. M. E." in the following manner:—Place the saw from the center forward parallel with the carriage, provided that does not throw it off more than one-thirty-second of an inch on the back side. Give the mandrel one-sixteenth-inch end play, and do not try to run the saw at a speed much above what you can maintain through the log, carrying from three-fourths to one and one-half inch feed. Place the guides as high as they can be. Now take hold of the pulley and pull the mandrel endwise until the collar strikes the box; then set up the guide on that side so as to crowd the saw a little; then pull the mandrel the other way, and set up the other guide the same. Have the play between the guides less than the end play of the mandrel. To joint the saw use a piece of grindstone, and run the saw fast; then it will not saw into the grindstone. I always leave just a shade of this jointing on the points of the saw teeth. File the teeth about one and three-fourth inch long on the under side, and have that side on a line that would cut off one-fifth of the saw. File the top of the tooth one and three-fourth inch from the point on a line to strike the point of the next tooth behind. I use an upsetting tooth to bring out the corners of the teeth as they wear off. Each side of the saw needs to be exactly alike, both as to set and angle of filing. Do most of the filing on the under side, and never turn a feather edge; better leave the tooth a little dull; the saw will not run so long, and soon gets out of round. Push the file the whole length with a straight and strong but slow motion. Any cutting edge on hardened steel cannot stand much speed. Taylor D. Lakin.

Hancock, N. H., April 2, 1866.

[What is the object of giving end play to the mandrel? Where it is done the saw has to do what the shoulders of the mandrel should.—Eds.

### A Magnetic Safe.

Messrs. Editors:—Please explain the following phenomena, and thereby arrest an argument, which the parties seem determined to fight out all summer.

Take a mariner's compass in one hand, a bar of iron in the other. Hold the bar vertical on the north of the compass. Bring the two in contact at the upper end of the bar. Gradually push the compass down to the lower end, and note how the needle has been reversed. Reverse the bar, put the compass on the north, hold the bar horizontal, and account for the various positions taken by the needle.

Try the experiment on the iron safe which is in your office, with this modification. Do not hold it in your hand. R. B. Stuart.

Ossining, N. Y., March 30, 1866.

[The north pole of one magnet will attract the south pole of another. Almost any bar or mass of iron that is kept for a long time in a vertical position, or in a north and south position, becomes a magnet; and then one end will attract the north pole of a mariner's compass, and the other the south pole. We have repeatedly tried shovels, tongs, safes, and other pieces of old iron with a compass, and we have never found one that was not a magnet. Of course, if such a bar of iron could be poised with sufficient delicacy, it would point north and south, and thus serve as a compass.—Eds.

### Melting-pots.

Messrs Editors:—A branch of the government may require melting-pots made of crucible clay. Should any maker advertise in your paper, I will write to him and will order through the proper office. D. C.

Washington, March 28, 1866.

### To Prevent the Loss of Aroma in Roasting Coffee.

The berries of coffee once roasted, lose every hour somewhat of their aroma, in consequence of the influence of the oxygen of the air, which owing to the porosity of the roasted berries, it can easily penetrate.

This pernicious change may best be avoided by strewing over the berries, when the roasting is completed, and while the vessel in which it has been done is still hot some powdered white or brown sugar (half an ounce to one pound of coffee is sufficient). The sugar melts immediately, and by well shaking or turning the roaster quickly, it spreads over all the berries and gives each one a fine glaze, impervious to the atmosphere. They have then a shining appearance, as though covered with a varnish, and they in consequence lose their smell entirely, which, however, returns in a high degree as soon as they are ground.

After this operation, they are to be shaken out rapidly from the roaster and spread out on a cold plate of iron, so that they may cool as soon as possible. If the hot berries are allowed to remain heaped together, they begin to sweat, and when the quantity is large, the heating process, by the influence of air, increases to such a degree that at last they take fire spontaneously. The roasted and glazed berries should be kept in a dry place, because the covering of sugar attracts moisture.

For special cases, such as journeys and marches, where it is impossible to be burdened with the necessary machines for roasting and grinding, coffee may be carried in a powdered form, and its aromatic properties preserved by the following process:—One pound of the roasted berries are reduced to powder, and immediately wetted with a sirup of sugar, obtained by pouring on three ounces of sugar two ounces of water, letting them stand a few minutes. When the powder is thoroughly wetted with the sirup, two ounces of finely-powdered sugar are to be added, mixed well with it, and the whole is then to be spread out in the air to dry. The sugar locks up the volatile parts of the coffee, so that when it is dry they cannot escape. If coffee is now to be made, cold water is to be poured over a certain quantity of the powder, and made to boil. Ground coffee prepared in this way, and which lay exposed to the air for one month, yielded on being boiled, as good a beverage as one made of freshly-roasted berries.—*Liebig*.

Mr. O. C. Crane, of No 330 Delancy street, has shown us a long cut taken from a piece of round steel, two and one-half inches diameter, which is sixty-eight feet long in one continuous piece.

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### Improved Sawing Machine.

This machine is principally intended to to cut down standing timber, but is so designed that it may be used subsequently to cut the wood up into lengths for any purpose, but more especially for firewood. Full views are given in the accompanying engravings of it in both positions as it appears at work. In order to facilitate its transportation to various localities, or from one point to another when in use, the machine is set upon wheels.

Fig. 1.

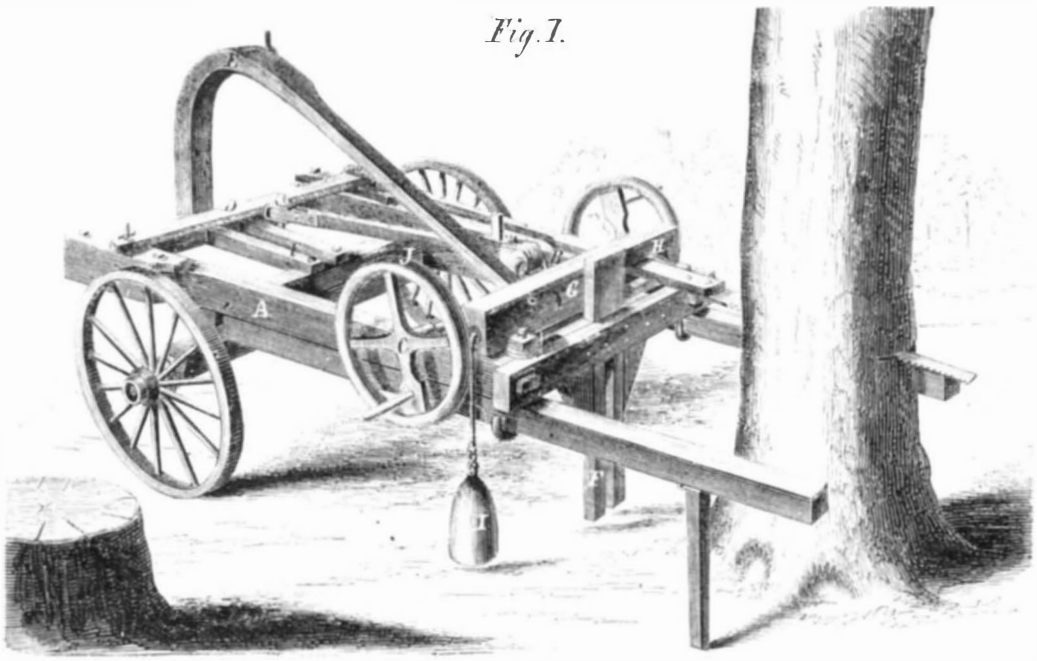
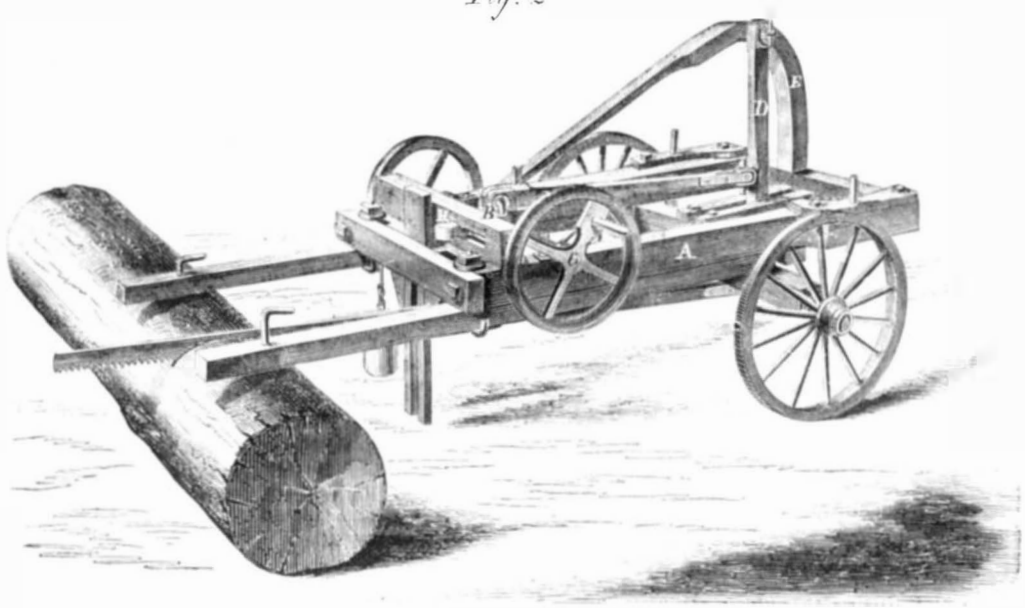


Fig. 2



LOGAN'S SAWING MACHINE.

In detail it consists of a frame, A, carrying a crank shaft, B, on the front end. The shaft, being driven by the crank wheel, C, imparts motion to the saw through the agency of a lever, D, jointed to a curved support, E, the saw being attached to the lever below the frame. Guides, F, are provided which serve to keep it straight and prevent buckling when at work. Where the machine is used to cut down trees the saw is above the frame and works horizontally, as shown, instead of vertically. A bolster, G, is also provided as a guide, in which there is a mortise through which the saw passes, and a gib, H, is fitted to this mortise against which the back of the saw works. This gib has a long surface and presses the saw, or feeds it up to the tree, through the agency of a weight, I.

The hind end of the frame, where it bears on the axle, at J, is rounded off so that the machine may accommodate itself to inequalities of surface. By these several parts and the arrangement of them the inventor claims to have invented a useful machine which can be applied to the purpose set forth. The reader will understand that there is but one machine which is capable of being used on different kinds of work.

For further information address Jas. R. Logan, Bellmore, Ind., by whom a patent was obtained Dec. 19, 1865, through Scientific American Patent Agency.

### Ready Mode of Amalgamating Zinc Plates.

Mr. B. Gibsone writes to the editor of the *Chemical News* and says:—"I venture to send you a method of almost instantaneously amalgamating corroded zinc battery plates, which occurred to me recently, after some twenty years' trial of different plans; perhaps economy of time in even humble matters of detail may be worth record where the process is of repeated occurrence.

"The following treatment in the case of thickly oxidized plates will yield in speed and effectiveness to few:—Place in a flat dish two ounces of common hydrochloric acid, one drachm of a saturated solution of bichloride of mercury (corrosive sublimate), and half an ounce of the latter metal; lay the zinc without previous scouring, in the liquid mixture, and gently smear the mercury over the surface of the plate with a tooth brush; the mercury will readily and thoroughly adhere to each portion of the surface as the oxide is rapidly dissolved by the HCl.

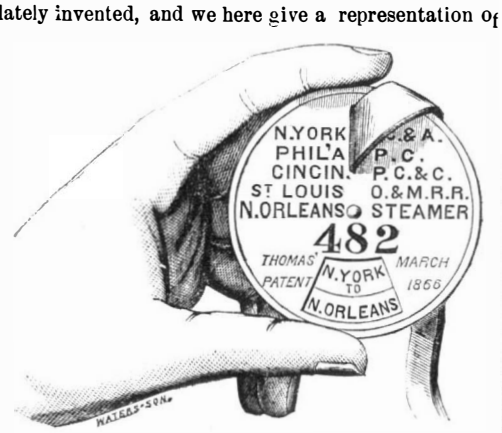
"As a means of comparing spee , in seventy seconds, I completely coated inside and out a cylindrical plate of forty square inch surface, whose interior was rather inaccessible and very corroded.

"A set of six cylindrical cells of Groves' battery were thus, with the same materials, amalgamated, equipped, and primed for action in a quarter of an hour.

"No friction is needed; the plates should be well drained from excess of mercury, lest they become brittle, though this danger is lessened by the rapidity of the process."

### THOMAS'S RAILWAY CHECK.

A novel check for use on railway trains has been lately invented, and we here give a representation of




it. It consists of two brass disks, one inside the other, held in the proper position by the strap. The outer one may have the names of any roads engraved thereon, while the inner one contains the principal cities and towns along the route. This check is set, at the beginning of the journey, at the place the traveler starts from and the one he is going to, so the baggage master, or others in authority, can see, at any station, exactly where the trunk has come from and how far it has to go, a little opening in the outer disk enabling the direction to be read, as may be seen in the engraving, where the check reads from New York to New Orleans.

A very important consideration in reference to the through route check is, that one check will take the place of twenty-five checks, and can be constantly used on the different routes of travel, and also serves as an advertisement in keeping the name of the route which the traveler is passing over continually before him. Immediately upon the arrival of the baggage with the check attached to it at any station, the baggage agent can, in one moment of time, remove the check from the baggage just arrived, and return it with other baggage to any of the several points named on the check.

This is also a local check which serves to answer the purpose of some two or three hundred checks. It represents one hundred stations by its peculiar construction, so arranged as to be kept constantly traveling to and fro from one end of the line to the other. As we have stated, they require but one minute's time for a person of the most ordinary capacity and intelligence to become acquainted with the manner of changing their destinations. They are in no way, manner, or form, complicated. No springs or anything connected with them which render them liable to get out of order; and their cost, comparatively speaking, is from two to three hundred per cent. less than the checks at this time in use, thereby the means of saving hundreds and thousands of dollars to railroad companies. For further information address G. F. Thomas, Nos. 443 and 445 Broadway, New York City.

### Simple Process for Silvering.

An employee of the Bavarian Mint has published an improved process for silvering copper, brass, and other alloys by means of a solution of silver in cyanide of potassium; the difference from the usual method consists in the use of zinc-filings, with which the objects are coated; when the silvering solution is applied, an immediate deposition of a much more durable character taking place. The filings are easily removed by rinsing in water, and may be used repeatedly for the same purpose. Metallic iron may be coated with copper in the same manner, by substituting for the silver, a solution of copper in cyanide; and over this copper deposit a coating of silver may be applied.

It is suggested in the London *Chemist and Druggist* that chloroform is an excellent medium for the removal of stains of paint from clothes, etc. It is found that portions of dry white paint, which resisted the action of ether, benzole, and bisulphide of carbon, are at once dissolved by chloroform.

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THE

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## POWER REQUIRED TO DRIVE MACHINERY.

"How many pounds of steam does it take to turn your engine over without the machinery at work?" said one engineer to another recently.

"Well I don't know," he replied; "about ten, I suppose."

"I will wager," said the other, "you cannot pass the center with less than thirty."

He looked incredulous.

"To-morrow morning I will try it," and he did so.

He opened the throttle when the gage showed fifteen pounds and the crank was on the dead half center, but the wheels never stirred. He waited a little until the cylinder got hot; he blew the condensed water out and tried it again at twenty, but the crank never moved. At twenty-five pounds it made half a stroke but stopped on the center, and at thirty it barely turned over.

"I wouldn't have believed it," he said to himself.

This was a high pressure engine, 11 1-2-inch cylinder and 32-inch stroke, working at a boiler pressure of fifty-five and sixty pounds to the square inch. Nearly two-thirds of the pressure was absorbed in the friction of the belts, shafting, and machinery. This is not an isolated case. It is quite common, and few engineers are aware of the great loss daily incurred by simple neglect.

It is not difficult to account for it when we reflect that in many shops it is accounted of no importance if shafting is out of line, or belts laced up so tight that bearings heat; that it is of no moment whether the separate machines are in good order or not, and that one kind of oil is thought as good as another. To us it seems strange that men should be willing to pay tithes to carelessness—to waste means on nothing when money is so hard to get. It is certainly a small thing to line up shafting and to look after the other details. In the matter of oil, it is a well settled fact that the purest is the best, and that the use of cheap lubricants (so called) is a mistake. Shafting that is in line will work without any binders on the bearings, for the belts serve the same purpose, and no cap is needed except a slight cover to keep dust out.

By actual test with a dynamometer Bourne gives the following work done by an engine of 23 1-2 horse-power: Two pair of stones, 4 feet 8 inches diameter, grinding wheat; two of the same size grinding oatmeal; one dressing machine; one fanner; one dust screen, and one sifter. One set runs 85 revolutions per minute, the other 90. The oatmeal stones run 120 and 140 revolutions per minute.

He also instances a cotton mill of 2,562 spindles, each making 2,200 revolutions per minute. The bobbins were $1\frac{7}{8}$ long, the thread portion being $2\frac{3}{16}$ long; there were also five turning lathes, three polishing lathes, two bobbin machines, two saws, one 22 inch, the other 14, and 24 bobbin heads. When all the machines were off except the spindles, the actual power required was that of 21 horses, so that each horse-power drives nearly 123 spindles. A small engine of 10-inch bore and 4-feet stroke, making 35 revolutions, with steam at 90 pounds, drove two muley saws of 34-inch stroke, cutting 30 feet of yellow pine per minute, 18 inches thick.

The friction of a steam engine in good order is variously estimated at from five to eight pounds to the square inch. Of course the proper way to find out the actual figures is to take a diagram with the engine and shafting in motion, and another with the engine alone—the difference of the two showing the effective pressure. Very few persons are willing to take the trouble to do this, but go on grumbling at the high price of coal and of the waste of fuel, when they alone are to blame.

If we are to have any radical change in the waste of power in manufacture, we must begin at the details. We have spoken of this so much that we fear our readers are almost as tired of it as we are, but when we reflect upon the immense losses through simple and sheer neglect, we cannot keep silent.

## PETROLEUM AS FUEL FOR STEAM ENGINES TO BE TESTED.

Among the amendments to the Naval Appropriation bill which have been agreed to by both Houses of Congress, is one appropriating $5,000 to test the value of petroleum as a fuel under marine boilers. It is to be hoped that this slice of the people's money will be entrusted to the hands of men who will expend it for the people's benefit—who will conduct their experiments in a fair and open manner, allowing all their steps to be made public as the experiments proceed.

There has been very general complaint among the engineers of the country, and manufacturers who are using steam power, that the costly experiments which are being made at the Novelty Iron Works, to test the economy of expansion, are withheld from the public. It is hinted that the conductors of these experiments, in forbidding the press access to the trial, intend to keep the public, who pay the expense of these costly private exhibitions, in blissful ignorance of the result until they can come out with a ponderous gilt-edged volume of reports, at another heavy expense, for their own glorification.

## ZINC PLATES FOR PRESERVING BOILERS FROM CORROSION.

The statement seems incredible, that for forty-two years science has been in possession of cheap and simple means for completely protecting steam boilers from rust, and yet these means have never been made use of in the arts. The great Collins steamer *Baltic* is now lying in the East river, and on the wharf by her side is an enormous pile of iron rust, that formerly made up the tubes and tube sheets of her boilers. These boilers cost many thousands of dollars, and their condition is similar to that of hundreds of other boilers in this and other countries. Can it be that a few plates of zinc soldered to these boilers would have preserved them entirely from this decay? There is every reason, short of extensive practical trial, to suppose that they would.

In the year 1824, Sir Humphrey Davy announced his discovery that if a metal which is corroded in salt water is placed in contact with a second metal that is more easily corroded, the action is confined to the second metal, and the first is perfectly preserved. This principle is not limited to the action of salt water, but holds in regard to all corrosive fluids; the most easily corroded metal is called the positive, and the protected one the negative.

Sir Humphrey Davy proposed to protect the copper sheathing of ships from corrosion by attaching to it pieces of zinc, but the plan did not prove a practical success. It has been generally understood that the cause of the failure was the perfection with which the copper was preserved—it was said that the copper was kept so bright that barnacles adhered to it, a slight coating of the poisonous oxide of copper being supposed necessary to drive these shell fish away. M. Becquerel says that this impression of Davy's was erroneous, that neither barnacles nor seaweed adhere to bright copper, but that the real cause of the failure of Davy's process was the erroneous theory adopted by its author. Davy supposed that the mere contact of the two metals was sufficient, while the fact is, the protection is due to the chemical action going on between the more easily corroded metal and the liquid. A coating of oxide or other salt soon forms on the surface of this metal, and stops the action, when the protection ceases. To continue the protection, therefore, it is necessary that this coating should be constantly, or frequently, removed.

There is a limit to the area of iron surface which a piece of zinc will protect, though it is very large. A few small pieces of zinc would probably protect the largest boiler; they should be soldered to the iron, and should be so situated that their surfaces could be frequently scoured or scraped.

## A BRILLIANT SERIES OF EXPERIMENTS.

Arrangements have been made for a course of three lectures at the Academy of Music, in Brooklyn, by R. Ogden Doremus, M. D., Professor of Chemistry and Toxicology in the Bellevue Hospital Medical College, and Professor of Chemistry and Physics in the Free Academy, on "Views of Life through the Medium of Natural Science." It is stated that "efforts will be made to demonstrate the recent discoveries in science, especially in the departments of heat, light, electricity, magnetism, eleotro-magnetism, thermo-electricity, etc., on a scale commensurate with the size of the edifice in which they will be exhibited."

As Professor Doremus is distinguished for the magnificent scale on which he conducts his experiments, and as these are to surpass all his former efforts, the opportunity to witness them must be a rare treat. Among them will be exhibited the cascade of light, of which we spoke in a recent issue.

## THE ENGLISH IRON CLADS.

One of the latest English iron-clads, the *Bellerophon*, is only half clad. That is, for a portion of 160 feet on each side, she is entirely without protection. The central armor is only 100 feet in length, but an iron-plated bulk head $5\frac{1}{2}$ inches thick incloses and protects the battery. All the forward part of the ship is vulnerable to shells, and may therefore be blown to splinters. Possibly the battery and the iron bulk head $5\frac{1}{2}$ inches thick, the engines and boiler possess sufficient buoyancy to keep the frigate afloat after one-half of her has been destroyed. It is said that broadside vessels cannot be completely protected and retain their speed; in other words, that fine models cannot carry the weight of armor necessary to render them invulnerable, but one of our ship builders has shown in the *Re D, Italia*, that a vessel of 285 feet in length, and 50 feet beam, $4\frac{3}{4}$ inches of armor all round, can cross the Atlantic fully equipped at the average speed of 11 knots, without in the least straining herself or even opening the seams in her armor.

## NEW PUBLICATIONS.

AMERICAN JOURNAL OF MINING.—This is a neat well-printed journal, lately started, and devoted, as its title indicates to mining and kindred matters. It is illustrated and contains full reports of the condition and prospects of the mines in Colorado, California, and other territories. It is published by Western & Co., 37 Park Row, at $4 a year.

THE MOTHER'S ASSISTANT AND THE HOME MONTHLY—These are two different publications issued from the same house, and are calculated to elevate the taste and morals of families. Select tales of an unexceptional character, together with music of a devotional nature, are given in each number. Besides there are poetry and pictures, so that all tastes are likely to be suited. C. H. Pearson & Co., Boston Mass., and American News Co., New York.

STEEL MARKING STAMPS.—Our readers frequently inquire for the above tools, especially patentees who wish to stamp the date of patent upon their inventions, upon brass or iron. Makers of dies would do well to keep a short standing advertisement in the SCIENTIFIC AMERICAN.

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### 53,552.—Quartz Crusher.—S. F. Ambler, Tuolumne Co., Cal.:

I claim the strip or flange, c, attached to the mortar box, A, of a float quartz battery, substantially as shown, for the purposes set forth.

### 53,553.—Weighing and Measuring Grain.—D. D. Armes, Decorah, Iowa:

First, I claim the combination of the measuring boxes, C D, slides, B' B', and bales, d d, and arms, e e, substantially as and for the purpose set forth.

Second, The self-emptying cups, m' n', in combination with the rods r' r', and links s s, substantially as and for the purpose set forth.

Third, The arrangement of the shoes, M N, links, s s, and rods, r' r', in combination with the cups, m' n', rods l l, bar, K, and boxes, C D, substantially as and for the purpose set forth.

### 53,554.—Safeguard for Watches.—Eugene F. Badgley, Brooklyn, N. Y.:

First, I claim the attachment to a watch or locket case of a clamp or ring, when constructed in the manner and for the purpose as described.

Second, I also claim the strap or its equivalent, when attached to a watch or locket case by a clamp or ring, in the manner and for the purpose as described.

### 53,555.—Gage Cock.—Phinehas Ball, Worcester Mass.:

First, I claim the combination and arrangement within the chamber, V, of the filter, S, with the water way, I, and port, n, as and for the purposes stated.

Second, The combination of the coupling, B, with body, K, having a water way, I, and port, m, arranged and operating substantially as set forth.

Third, The combination with the plug, P, of the ports, m, n and t, arranged and operating substantially as set forth.

### 53,556.—Carriage Spring, etc.—M. L. Ballard, Ganton, Ohio:

I claim the uniting and holding the ends or plates of a spring by means of an independent cap, and bolt or rivet made and applied, substantially in the manner and for the purpose described.

### 53,557.—Street Sprinkler.—L. F. Bancroft, Worcester, Mass.:

I claim making the upper part of the water reservoir, A, circular, and the bottom flat, in combination with the use of the clamping bands, L, and tightening nuts, f.

### 53,558.—Tool for Trimming Boot and Shoe Heels.—S. C. Bedell, Red Bank, N. J. Antedated March 30, 1866:

I claim a tool for trimming boot or shoe heels, having the general construction and arrangement herein described, and either with or without an adjustable cutter stock, operated as specified.

### 53,559.—Plows.—Alonzo T. Boon, Galesburg, Ill.:

First, I claim the spiral cam, C, in connection with the shaft, c, for operating either a mole or subsoil plow, substantially in the manner and for the purpose herein set forth.

Second, The standards, B B, either of the subsoil or mole plow, having a series of notches or teeth, b, as arranged and used in their connection with the spiral cam and groove of the beam, A, substantially in the manner and for the purpose as herein set forth.

Third, The arrangement of the brace bar, E, in its relation to the standards, with shackle bar and connecting rod, d, attached to the beam of the plow, substantially in the manner and for the purpose as herein set forth.

Fourth, The arrangement of the mold board, F, with the subsoil plow, substantially in the manner and for the purposes as herein set forth.

### 53,560.—Car Coupling.—John W. Boughton, Appleton, Wis:

I claim the combination of the shouldered tumbler, obliquely set coupling pin and corresponding opening, operating substantially as described and represented.

### 53,561.—Social Game.—Milton Bradley, Springfield, Mass. Antedated March 30, 1866:

I claim as an article of manufacture, the social game, substantially as herein set forth.

### 53,562.—Letter Boxes.—W. H. Bramble, Decatur, Ill. Antedated March 30, 1866:

I claim the use of hinged or adjustable doors or lights for post office boxes, when said doors or lights are operated from the inside of the office or box for the purpose of facilitating the delivery of letters, as herein specified.

### 53,563.—Manufacture of Bronze Powder.—Leopold Brandeis, Brooklyn, N. Y.:

I claim the production of grains, scrapings, filings, shavings or borings from copper, tin, etc., their alloys by proper tools, like a turning lathe or other tool; to flatten these particles of metal by means of rollers or stampers with polished steel of chilled surface, for the purpose of getting them bright and brilliant to manufacture therefrom bronze powder in any way used for the purpose of reducing these small flat fragments to still finer ones, always offering a bright surface, just the same as if the metal had passed previous through all the processes of repeated hammerings, annealings, rollings, beatings, etc., etc.

### 53,564.—Drill Cable Meters.—L. C. Bristol, Victor, N. Y.:

I claim in combination with the drill cable or its equivalent, of well boring apparatus, a meter having a traction wheel or pulley, substantially as shown, for the purposes herein set forth.

### 53,565.—Plowshare.—P. H. Bronson, East Avon, N. Y.:

I claim securing the detachable false point, P, to the shares of plows, by means of the screw bolt, S, and the dove-tail locking lips, a b and c, substantially in the manner and for the purposes herein set forth.

### 53,566.—Step Ladder.—Charles W. Brown, Newark, N. J.:

I claim the arched brace of wood in one piece, spanning the ladder frame, substantially as specified.

### 53,567.—Corn Sheller.—William R. Burns, Lancaster, Pa.:

I claim the combination of the adjustable shelling bar, with its slots, I I I, and the concave, double-inclined bottom, P1 P2, with its opening, V, under the spiked cylinder, G, together with the vibrating sieve, S, shaking attachment, L m K and D, fan, B, and flue, C, when these several parts are arranged and operated substantially in the manner described for the purpose specified.

### 53,568.—Carriage.—Clarke T. Bush, Rensselaerville, N. Y.:

I claim the arrangement and combination of the side springs, e e, yielding perch, f, diagonal braces, h h', slot or loop, i, hinges, p p, substantially as and for the purposes set forth.

### 53,569.—Method of Extracting Gold and Silver from Ores.—Charles F. Carpsuter, Louisville, Ky.:

I claim the manner of using atmospheric air for the purpose of facilitating the extraction of gold and silver from ores, causing a separation between gold or silver and the ores of baser metals, and consists in introducing the said atmospheric air between the flame of a reverberating furnace and the ores containing gold or silver which are spread upon the hearth of the furnace.

### 53,570.—Valve Gear for Oscillating Engines.—Henry T. Carter. Portland, Me.:

I claim the rocking valve stem, S, arm, a, in combination with a slotted link upon the trunnion box cap, in the manner and for the purpose herein set forth.

### 53,571.—Means for Attaching Legs to Music Stools.—Elijah D. Castelow, Meriden, Conn.:

I claim the combination of the pillar, A B, with the blocks or pieces, C, the legs, D, and disc, d, when the dovetails are made to fit and the disc to hold, substantially as herein described.

### 53,572.—Spring Power for Propelling Carriages.—Wm. K. Chase, Charlestown, Mass.:

I claim the springs, K K, one or more, applied to a drum, I, placed loosely on a shaft, E, to which wheels, F F, are attached, in connection with the pinions, D, on the hubs, a, of the hind wheels of the wagon, the ratchets H H and J, on drum, I, the yokes, L L, lever, M, and sliding rod, N, and the pawls, b b, on the wheels, G G, of shaft, E all arranged and applied to operate in the manner substantially as and for the purpose specified.

I further claim arranging the shaft E, so that it will have a forward and backward movement in its bearing to admit of the wheels, F, being moved in and out of gear with the pinions, D, when said shaft, thus arranged, is used in connection with keys, d d, of the levers, P, and the springs, K K, with their outer ends attached to the frame, A, or to a fixture thereof, substantially as described,

### 53,573.—Stair Carpet Pad.—George W. Chipman, Melrose, Mass.:

I claim as a new article of manufacture, the stair carpet pad constructed of one or more layers, consisting of fibrous matter covered on each side with sheets of paper and enveloped in a closed case of textile material, when the whole is quilted at several points through all the materials composing the pad.

### 53,574.—Railway Car Coupling.—Thomas J. Christy, Noblesville, Ind.:

I claim the drop latch, L, when the same is constructed substantially as shown, with pivoted slot, p, and inclines, d and i, each performing the offices described, all constituting a self-acting car coupling, as set forth in the foregoing specification.

### 53,575.—Grain Drier.—George Clark, Buffalo, N. Y.:

First, I claim a closed or air-tight grain drying kiln or chamber, combined and operating in connection with air-heating furnaces, and blowing air pumps or fans, for the purpose and in the manner substantially as described.

Second, In the combination with said air-tight grain drying kiln or chamber, of an exhausting air pump or fan, operating in the manner and for the purpose set forth.

Third, Providing said air-tight grain drying kiln or chamber, having an exhausting air pump combined therewith, with valves or doors, which may be opened to admit cold air therein, for the purpose set forth.

Fourth, The combination with said air-tight drying kiln or chamber of one or more evaporation escape valves, G, or other equivalent device, operating in the manner and for the purpose substantially as herein described.

Fifth, In the combination with said air-tight drying kiln or chamber, or with an auxiliary cooling chamber, of a cold air inlet valve or valves, H, or other equivalent device, operating in the manner and for the purpose substantially as herein described.

### 53,576.—Broom Head.—James O. Clay, Hudson, Wis.:

First, I claim a broom head or frame consisting of the piece, B, having the socket formed thereon, and the piece, A, provided with the arms, a and d, fitting in the openings in said socket, said piece being hinged at b, as shown and described.

Second, securing the handle in place by means of the projection, c, and the groove, l and e arranged and operating as set forth.

Third, I claim the central strip, F, in combination with the parts, A and B, when constructed and arranged as herein shown and described.

Fourth, I claim forming the teeth on bars, C and D, with their faces standing diagonally, as and for the purpose set forth.

### 53,577.—Rotary Plows.—Levi H. Colborn, Chicago, Ill.:

First, I claim giving the helical or screw plow blades of a rotary plow, in addition to their screw form, an additional curvature from the periphery toward the centre, beginning at or near the entering edge, and gradually increasing toward the leaving edge, the same being a development of the mold board of the common plow around an axis of revolution.

Second, Attaching to a rotary plow blade at any suitable place thereon, a horizontally projecting cutter in order to give a horizontal slicing undercut to the furrow, substantially as set forth.

Third, Making rotary plow blades adjustable on their propelling shaft, so that they may be set to cut furrows of different widths by attaching two, three or more blades to the shaft, as set forth.

Fourth, Connecting the plow blades to the plow shaft, so that their delivery end shall project in rear of the shaft, and be left free and unobstructed substantially as described

Fifth, Connecting the plow shaft to the axle of the driving wheels by a loose journal, D, so as to allow the plow to vibrate in order to pass small stones and other light obstructions, substantially as set forth.

### 53,578.—Gig Tree.—Edward A. Cooper, Lancaster, N. Y.:

First, The square raised shank, C', on the check hook, E, and corresponding mortise in the tree plate, in combination with a binding screw or bolt, as described.

Second, The grooved cantle b', and sliding back plate, F, combined and operating in the manner and for the purpose set forth.

Third, The erret nuts, H, with end lips h', and notches, i2, in combination with the end tits, i, cast on the tree plate, as and for the purpose set forth.

Fourth, Riveting the flaps, M, to the tree plate on each side of the back straps, L, as set forth.

Fifth, The tongue, K, cast on the back side of the tree plate to secure and hold the pad in the manner described.

### 53,579.—Bed Spring.—Delos V. Crandall, Canton, Iowa:

I claim inserting the coiled wire in the aperture, C, of the slat B, and fastening it by the stopper, D, as herein described and for the purposes set forth.

### 53,580.—Mangle and Wringer.—David Cumming, Jr., New York City:

I claim the use of the abutments, g g, in combination with two or more rollers, arranged substantially as described and for the purposes set forth.

### 53,581.—Apparatus for Distilling Spirits.—H. G. Dayton, Maysville, Ky.:

First, the evaporating pan, E, with a steam jacket, o, in combination with rose, n, coil, F, steam drum, B, and still, A, constructed and operating substantially as and for the purpose described.

Second, The annular steam chambers, C D, one or more in combination with the evaporating pan, E steam jacket, d, still, A, and drum, B, constructed and operating substantially as and for the purpose set forth.

### 53,582.—Bullets for Small Arms.—John G. De Coursey, Philadelphia, Pa:

I claim the within-described projectile for small arms, the same being composed of the central tubular lining of tinned iron, round and to which is cast a leaden exterior, tapering in front as described, in combination with a hard metal washer, B, bearing against the rear of the said tube, the whole being otherwise constructed as set forth, for the purpose specified.

### 53,583.—Manufacture of White Lead.—Clarence Delafield, Factoryville, N. Y.:

I claim, First, Uniting or combining a solution of the nitrate of lead or its equivalent for this purpose, made substantially as described, with a solution of the carbonate of potash, or its equivalent for this purpose, made substantially as described for the purpose of producing the white lead of commerce.

Second, Uniting or combining a hot solution of the carbonate of potash, or its equivalent for this purpose, with a hot solution of the nitrate of lead, or its equivalent for this purpose, without regard to the proportions in which the two solutions are made, for the purpose of producing the white lead of commerce.

### 53,584.—Reservoir for Wells.—R. H. Dewey and E. M Tillotson, Pittsfield, Mass.:

We claim in its application as a buried water reservoir in the bottom of a well, the filtering chamber consisting of a perforated cylinder whose intervening spaces are filled with filtering material, the central space forming a chamber from which the water supply is drawn by an ordinary elevating device, as described.

### 53,585.—Door Latch.—Henry L. De Zeng, Geneva, N. Y.:

I claim, First, The sliding latch, A, and bolt, B, constructed substantially as specified.

Second, The cheek latch, F, in combination with the cleat, D, and latch, A, and bolt, B, all being constructed and arranged substantially as set forth.

### 53,586.—Rock Drill.—Julius C. Dickey, New York City:

I claim the central drill bit, B, made to answer the purpose of a reamer, in combination with the drill bits, A and C, substantially as set forth.

### 53,587.—Typographic Printing.—John Donlevy, New York City:

I claim, First, The utilizing the spaces between the letters and lines of text, left blank in ordinary printing, by filling such spaces, by means of utilizing lines, with a pictorial back ground, divided into sections and adapted to arrange alternately or otherwise, with the lines of text, spaces, quadrats, etc., substantially as and for the purposes set forth.

Second, The use and application of improved intaglio type, with plain surfaces, which adapt such type to artistically unite with type high spaces, quadrats, and utilizing lines, corresponding to, and when set up on a level, with the surface of the type, for the purpose of producing stereotype plates adapted for subsequent ornamentation.

Third, The combination of the type previously described as bas-relief type, with plain surface intaglio type, for the purpose of producing illuminated and polychromatic effect.

Fourth, I claim the combination of plain-surface intaglio types with figured-surface utilizing lines, or figured-surface intaglio types with ornamented utilizing lines, by which is produced a new and useful style of contrast-tint typography, substantially as and for the purposes set forth.

Fifth, I claim the artistic dissection of any pictorial or decorative subject in spaces, quadrats and utilizing lines, and their combination with each other and with letters or lines of letters or texts, so as to reproduced from the whole a typo-pictorial subject, substantially as and for the purposes set forth.

### 53,588.—Axle Box.—D. H. Dotterer, Philadelphia, Pa.:

I claim, First, Fitting the sections of packing of a journal box in such manner that they may be adjusted from the outside of the box, substantially as described.

Second, constructing a sectional packing, C D, so that the section, D, may move within the section, t c, in combination with a bridge support, E, and springs, which are so applied as to keep such packing in place, substantially as described.

### 53,589.—Pen for Weaning Calves.—J. B. Dow, Davenport, Iowa:

I claim the calf-weaning and stall-feeding pen, constructed as herein described.

### 53,590.—Process for Amalgamating Gold, Etc.—F. N. Du Bois, Black Hawk, Colorado:

I claim the use of an amalgam of gold and mercury, substantially of such consistency as to render it adaptable for the purpose set forth.

### 53,591.—Churn.—Daniel Dunton, Brooklyn, N. Y.:

I claim the rotary dasher, B, constructed with an open center, substantially as shown, in combination with the plates or gatherers, e e, all arranged substantially in the manner as and for the purpose specified.

### 53,592.—Cultivator.—Solomon Dwight, Rockford, Ill.:

I claim the combination of the rigid tongue, the curved side pieces, the adjustable rear and middle cross beams, the adjustable handles, the swivelling plows, and the yielding-spring corn guard, when constructed, arranged, and operating as described.

### 53,593.—Railway Switch.—Stephen A. Emery and Frederick A. Prince, Portland, Maine:

We claim, First, The peculiar construction of the lever, d, with wings, in manner above described, or their equivalents.

Second, The peculiar construction of lever, f, and its adjustment in connection with shoulder, r, and key, g, and drop levers, e e, in manner above described, or their equivalents.

Third, The combination and use of lever, D, with lever, f, in conjunction with the wheel of a car or locomotive operating in the manner above described.

### 53,594.—Apparatus for Draining Cellars.—Augustus F. Erich, Baltimore, Md.:

I claim, First, The combination with the stationary vessel, A, provided with a pipe leading from the hydrant or other water supply, and with a discharge pipe, of the air-conducting pipe, E, vessel, G, discharge pipe or pipes, H H', and float, I, substantially as and for the purposes set forth.

Second, I claim the combination of the spring, K, with the cocks of the supply and discharge pipes of the vessel, A, and the collars, F, for giving a positive and distinct motion to the vessel, G, when the cocks are reversed, as explained.

### 53,595.—Medicine.—W. H. Farnham, Sparta, Wis.:

I claim the medical compound of the several ingredients mixed together or in about the proportions stated, and for the purpose specified.

### 53,596.—Steam Engine.—Isaac Ferris, Cincinnati, Ohio:

I claim, First, The open-ended cylinders, A A' B B' C C', and pistons, D D' E E', arranged, connected and operating substantially in the manner, and for the purpose set forth.

Second, In this connection the arrangemen of the parts N R R' and S S', for operating the valves, P Q, substantially as described.

### 53,597.—Mash Machine.—Jacob T. Forrer, Peoria, Ill.:

First, I claim the combination of the shaft, G, and post, D, with the tub, A, substantially as described and for the purpose set forth.

Second, the combination of the shaft, B, with the shaft, G, post, D, and tub, A, substantially as described and for the purpose set forth.

Third, The combination of the shovels, C, and arms, E, with the shaft, B, and tub, A, substantially as described and for the purpose set forth.

Fourth, The combination of the cap or casing, o, with the shafts, G and B, and with the post, D, substantially as described and for the purpose set forth

### 53,598.—Grinding Cylinders of Paper Engines.—Clinton T. Frost, Medfield, Mass.:

I claim the application of the grinding plates, a, to the cylinder of paper engines in such manner that they may be moved outwardly from its circumference, and secured in position, as occasion may require, as hereinbefore explained.

I also claim the peculiar construction and arrangement of the plate, a, and its support, b, that is with the lip, c, and grooves, f f, substantially in the manner and for the purpose as above described.

### 53,599.—Rock Drill.—George P. Ganster, New York City:

First, I claim the combination and arrangement of the flyer, C, ratchet wheel D, pawl, o, rock shaft, Q, rod, T, and a crank, S, on the axle, S', of the roller, S'', or its equivalent, substantially as and for the purpose herein specified.

Second, In combination with an unyielding roller H, of the construction substantially as herein described, I claim the elastic grooved roller, J, constructed and operating in the manner and for the purposes set forth.

### 53,600.—Brick Machine.—John George and Henry Hague, Jackson, Mich.:

We claim the attaching of the grinding or tempering arms, J, of

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the pug mill of a brick press to a tubular bar shaft, F, fitted loosely on the shaft, B, which has the presser attached and driving said shaft by means of gearing, so arranged that the shaft, F, will rotate more rapidly than the shaft, B, substantially as and for the purpose herein set forth

53,601.—Shutter and Blind Fastening.—Charles H. Gilman, Portland, Me.:

I claim the combination and arrangement as herein set forth of the plate, D D, cylinder, E, packing, B B, bar, A, with a catch or staple, all substantially as and for the purpose described.

53,602.—Rock Drill.—Lucius M. Gilmore, Janesville, Wis.:

I claim the drill or built tool, E, when constructed and arranged substantially a and for the purpose set forth.

53,603.—Grinding Mill.—Solomon Godfrey, Peoria, Ill.:

I claim the combination of the openings, D and E, and the flange, C, with the rim, A, and the runner, substantially in the manner and for the purpose described.

53,604.—Washing Machine.—J. T. Greenwood, Sen., Beloit, Wis. Antedated March 13, 1866:

I claim the crotchets, D D, and the application of the regulating device, consisting of the levers, E E, screw rods, H H, thumb nuts, h h, plates, i i, and the springs, I I, when constructed substantially as herein described and for the purpose set forth,

53,605.—Stovepipe Damper.—Demas L. Grover, Groton, N. Y.:

First, I claim the plates, C D and B the pin, F, and stays, G, when constructed and operated in the manner described and for the purpose specified.

Second, I claim the handle, E, and the connecting pin, H, when constructed and arranged in combination with the plates and supports so as to operate in the manner described.

53,606.—Filtering Apparatus.—John P. Gruber, New York City:

First, I claim the combination of an exhausting and forcing air pump with a filtering vessel, which is constructed with a central filtering partition, a movable cover, and with pipes, j k, leading from the chambers, E F, to the pump chambers, substantially as described.

Second, The combination of the adjustable imperforated cap, h, with the cylinder, d', and partition, D d, arranged within a vessel, A, which communicates with an exhausting and forcing air pump, substantially as described.

53,607.—Railroad Station Indicator.—Parson E. and John P. Gruger, Lancaster, Pa.:

I claim the arrangement of the bolt, D, springs, S S, spring case, F, pawls or clicks, c' c2, in combination with the reversely-toothed ratchets, B' B2, on the same shaft, O that carries the cog wheel, M, when all these parts are fixed upon a plate, A, constituting one end of the box or indicator, transferable from one rod, N, to the other, and actuated substantially in the manner specified,

53,608.—Photography.—C. A. Guilmette (assignor to himself and George P. Towle), Boston, Mass.:

I claim making a negative from which to print a photographic likeness of a person with a fac simile of an autographic signature, forming part of such photograph, by means of a card or tablet having the signature written upon it, and placed upon some part of the person, and so that the autograph shall be taken with the person in the negative picture and without showing the outline of the card or tablet, as herein above specified.

53,609.—Rotary Blower.—Frederick Hainsworth, Chicago, Ill.:

First, I claim the employment of a rotary series of bellows, when arranged and operating substantially as herein described.

Second, I claim in combination therewith, the hollow shaft or tube with the removable coupling, when operated for the purpose herein specified and shown.

53,610.—Preparing Timber for Cutting into Veneers.—Thomas Hanvey, Elma, N. Y.:

I claim preparing logs or blocks of wood for cutting or slicing into boards, veneers and the like, by the process of steam boiling in tanks or vats of water, substantially as herein described.

53,611.—Hominy Mill.—James Hayden, Philadelphia, Pa.:

First, I claim the combination of the adjustable, slide, W, with the shaker, Q, for regulating the supply of corn from the hopper, the said slide being arranged and operating substantially as described.

Second, The combination of the adjustable slides, J, with the plates, I, for regulating the discharge of the corn through the openings, p, substantially in the manner described.

Third, Constructing the slots, l, of the cylindrical pieces, H, with cutting edges, m, for removing a portion of the hulls from the corn, substantially as described.

Fourth, The combination of the beaters, l, and sections of the central shaft, B, by means of the screws on the inner ends of the former, and the pins, j, the several parts being constructed and arranged in relation to each other substantially as described and for the purposes specified.

Fifth, The combination and arrangement of the ventilator, S, with the central shaft, B, for creating a current of air through the grain compartments, substantially in the manner described, and for the purpose set forth.

53,612.—Vulcanizing Vessels for Dentists' Use.—George E. Hayes, Buffalo, N. Y.:

I claim a vulcanizing vessel constructed of an outer shell and an inner lining, substantially as herein specified, whereby on the lining being corroded through steam may escape between it and the shell, as herein set forth.

53,613.—Steam Engine.—William M. Henderson, Philadelphia, Pa.:

First, I claim the union of the valve chest with the steam cylinder in such manner that the roof of the main steam ports is formed by the bottom of the valve chest, in the manner and for the purposes represented.

Second, The connection of two piston heads in a cylindrical valve chest, by a spindle or its equivalent, said heads being united in motion, and carrying between them a sliding valve, to which is imparted a stroke less than that of the driving heads, substantially for the purpose specified.

Third, The described arrangement of the grooves, V V', and channels, I I, in the piston heads with the passages, X X', in the valve seat, when operating as herein set forth.

Fourth, The arrangement of the air holes, K K', through the piston heads operated by the action of the valve, in the manner and for the purposes herein described.

53,614.—Hay and Straw Cutter.—William Henshaw, Spencer, Mass.:

First, I claim the cast-iron knife frame, G, made in the peculiar manner described, and shown in the drawings.

Second, The combination of the arms, F F', with their ribs or flanges, C C, with the knife frame, G, as shown and described.

Third, The combination with the frame, J, of the adjusting screws, k k, as and for the purposes stated,

Fourth, The combination with the front end of frame, G, of the lip, m, rubber, n, rod, o, and spring, p, as and for the purposes stated.

Fifth, The combination with the frame piece, J, of the arm, F', and table, K, when cast together, as shown and described.

Sixth, The combination of the adjusting screws, g g, with frame, G', and knife, d, as and for the purposes set forth.

53,615.—Paper Bosom Machine.—Sylvester B. Hill, Chicopee, Mass.:

First, I claim forming ornamented paper shirt bosoms by passing the prepared paper through or between rollers, constructed substantially as and for the purpose set forth.

Second, Forming paper shirt bosoms between section rollers, so arranged that the change of the relative positions of the sections will vary the ornamental design of the shirt bosom, substantially as set forth.

Third, The combination of an ornamented sectional roller with a solid roller, and thus forming ornamental paper shirt bosoms, and varying their designs substantially in the manner described.

Fourth, The new article of manufacture, constituting an embossed paper shirt bosom, made substantially in the manner described.

53,616.—Fence.—W. D. Hillis, Elgin, Ill.:

First, I claim the wire or rod flattened at intervals, as described for the purposes set forth.

Second, I claim the picket provided with holes, E H E, Fig. 6, in combination with the wire, C D, substantially as described.

Third, I claim the mode of fastening the stringers, by means of their bent ends in the ring, I, secured by the spike, substantially as described and represented.

53,617.—Steam Generator.—Birdsill Holly, Lockport, N. Y.:

I claim the combination and arrangement of the vertically pendent tubes, C C, with the furnace, B, flues, d d, and water jacket, a, substantially in the manner and for the purposes described.

58,618.—Stave Machine.—Albert H. Hook, New York City:

I claim the clamp so constructed as to enable the jointing tools and the howeling, crozing and chamfering tools to perform their office upon the stave, without removing the stave from the clamp, said clamp being constructed for these purposes, substantially as herein set forth.

53,619.—Button Hole Cutter.—James A. and Henry A. House, Bridgeport, Conn.:

First, I claim the axially adjustable cutter, substantially as described for cutting button holes at any desired angle to the selvage.

Second, The combination of the axially adjustable cutter in one jaw of the pliers, with the adjustable plate in the other jaw of the pliers, when both are removable, to cut button holes of varying size, substantially as set forth.

53,620.—Folding Bedstead.—Tyler Howe, Cambridgeport, Mass.:

I claim the combination of the brace, C, constructed substantially as described, with the rail, A, the leg, B, and cross brace, E, the whole being arranged in manner and so as to operate together as specified.

53,621.—Water Elevator.—Edwin Hoyt, Stamford, Conn.:

First, I claim the friction wheel, D, having either a bevelled or plain periphery, in combination with the brake on the end of the crank, F, constructed and arranged substantially as described.

Second The brake, c, on the end of the crank, F, in combination with the friction wheel, D pin, E, end plate, B, and windlass, A, substantially as specified.

Third, Hanging or pivoting the crank, F, on a pin, E, which is secured loosely in the friction wheel, D by the plate B, whereby the crank and pin revolve together for adjusting the brake to the required position for arresting the velocity of the windlass, substantially as specified.

Fourth, I claim the recesses and arms, e, in the friction wheel, D, and inclined as shown, substantially as and for the purpose specified.

Fifth, I claim the lugs d, on the crank, F, as arranged in relation to the recesses and arms, e, in the friction wheel, D, for rotating the windlass, substantially as herein specified.

Sixth, I claim the rod, G, attached to the pawl, C, when arranged as described, and used in combination with the projection, c, on the crank.

53,622.—Pen.—Thomas S. Hudson, East Cambridge, Mass.:

I claim as an improvement thereon, the application of the ruler guard, A, to the pen carrier, b by means of a tube, B, to encompass and slide on the said carrier, such tube being furnished with a slot, C, or its equivalent, to operate with a stop, d, projecting from the carries, as set forth.

53,623.—Lamp Burner.—James G. Hunt, Cincinnati, Ohio:

First, I claim the construction, arrangement and combination of the shell, A a g, diaphragm D c, tube, G, wick tube, E, and lamp collar, C, substantially in the manner described.

Second, The construction, arrangement and combination of the diaphragm, D c, lower perforated portion, a, of case, A, and tubes, G E, all applied to the collar, C, of the lamp, substantially in the manner described.

Third, The wood button, P, in combination with the wick adjuster of a lamp burner, substantially as described.

53,624.—Broom Head.—John E. Hunter, Mechanicsburg, Ohio:

I claim the construction of the case for receiving the broom corn in combination with the toothed jambs or rings, C, and support, F, attached to the side of the said ring, substantially in the manner and for the purpose set forth.

53,625.—Process for Making Steel.—Thomas H. Jenkins, New York City:

I claim the process of making steel by using what is known as malleable cast iron, which has been subjected while in the heated state to the action of a solution, substantially such as described and melting it in admixture with wrought iron in a crucible or equivalent therefor, substantially as described.

53,626.—Washing Machine.—Watson Kenderdine, Lumberville, Pa.:

First, I claim the combination of the rotary cylinder, A, with its surface of cone-shaped fluted rollers, C, and the adjustable concave, G, operating substantially as described.

Second, I claim raising the concave, G, by means of the lever, o, rods N and L, and cross bar, M, or their equivalents, substantially as described.

53,627.—Stop Cock.—Martin C. Kilgore, Washington, Iowa:

I claim a stop cock in two halves, united by screws or bolts for holding the parts together or loosening them, and having the plug through which the fluid passes made straight and with a groove or V, in its surface to prevent its moving endwise, with lining in the box of soft metal having on it a projection answering to the groove or V, in the plug.

53,628.—Suspended.

53,629.—Blow Pipe.—N. W. Kingsley, New York City:

I claim a blow pipe having a valve for regulating the supply of gas thereto arranged, and opperating substantially in the manner and for the purpose described.

53,630.—Piston for Deep Well Pumps.—Elisha Y. Kneeland, Buffalo, N. Y.:

First, I claim a piston valve constructed in sections, B B' B2, with intermediate leather crown packing, f, and guiding rod, h, for the purposes and substantially as described,

Second, The arrangement of two, three or more leather packing cups, A, with corresponding compressing or holding rings, E, in combination with the piston, so that when the two parts of the piston are screwed together, the rings will be successively pressed upon the flanges of the packing cups and held in place for the purposes and substantially as described.

53,631.—Process for Molding Articles from Paper Pulp.—Edward H. Knight, Washington, D. C.:

I claim the process of making boxes and other hollow paper articles, substantially as described.

In the process of manipulating paper pulp and in combination with the former, possessing the described functional character.

I claim an air forcing or exhausting device, operating substantially as described.

I claim in combination with a former, constructed to operate substantially as described, an elastic hollow handle provided with valve guarded opening or openings

I claim a seamless box or other receptacle lid, lamp shade or other hollow paper article, made directly from pulp upon a pervious former in connection with an artificial draft, and blast of air or other fluid.

53,632.—Chamber Bucket.—Wm. W. Knight, Philadelphia, Pa. Antedated March 23, 1866:

I claim the seat, D, with its plate, E, adapted to and combined with the stop can, A, and its plate, b, in the manner described.

53,633.—Fluting Machine.—Susan Knox and W. D. Corrister, New York City:

We claim a fluting machine having the upper roller hung in a horizontal spring swinging frame, substantially in the manner described for the purpose specified.

53,634.—Portable Feed Rack.—Casper W. Lamb, Columbia City, Ind.:

I claim the combination and arrangement of the different parts of my farm-stock portable feed rack and shed, substantially as described and illustrated.

53,635.—Seed Planter.—James N. Lane, Bethel, Ky.:

First, I claim the scrapers, I, when hinged to the frame, and disposed diagonally to the line of draft, substantially as set forth.

Second I claim the arrangement of a seed planter for one horse, with seed valves operated by hand when the parts are constructed and combined, substantially as set forth.

53,636.—Purifying Isinglass.—Jesse Lewis and Isaac Stanwood, Gloucester, Mass.:

We claim separating from the swimming bladder or sound of the hake, or other fishes from which isinglass is usually made, the impurities by boiling, substantially as and for the purpose set forth.

53,637.—Hinge.—John R. Lomas, West Haven, Conn.:

I claim a hinge constructed substantially as herein set forth.

53,638.—Tag Needle.—Oscar Low, Chelsea, Mass.:

I claim my improved tag needle, made substantially in the manner and for the purpose as above set forth.

53,639.—Car Coupling.—Alpheus A. Lusk and Samuel A. Wells, Wooster, Ohio:

We claim a projection at the eye of the hook to prevent it from falling entirely back so that it will couple in any position.

53,640.—Manufacture of Steel for Safes.—Walter K. Marvin, New York City:

I claim as a new metal or alloy the composition herein described, the same consisting of chromium cast iron and wrought iron compounded in the manner and proportions herein before set forth.

Second, The construction of safe boxes, vault doors and other burglar proof structures by using the same of the metal herein-before described,

53,641.—Distilling Pine Wood.—James A. Mattocks, Swansboro, N C.

I claim the construction and arrangement of a retort, protected by sheet iron or other material, furnaces, flues, sliding grates and the application of heat to the upper surface of the tar, as shown in the accompanying drawings and specifications.

53,642.—Machine for Cutting and Stoning Peaches.—W. D. Mayfield, Ashley, Ill.:

First, I claim the feed wheels, t and u, in combination with the knives or cutters, a' a', arranged with regard to each other and operating substantially in the manner described.

Second, The wedge-shaped ends to the knives, for the purpose specified.

53,643.—Manufacture of Hard Rubber.—Charles McBurney, Roxbury, Mass.:

I claim the use of waste rubber for the production of hard rubber, as set forth.

53,644.—Flour Sifter.—William C. McGill, Cincinnati, Ohio:

I claim the arrangement of vibrating sweep, I, with flexible and jointed scraper, J, and concave sieve, B, substantially as set forth.

53,645.—Soap Mold.—John McRoberts, New Orleans, La.:

I claim the mold constructed of two parts, G H, of V form in their transverse section and placed in an inclined position so that said parts, when in contact, will form a rectangular box having an inclined position and resting on one angle or crown, the upper part, H, being movable and all arranged to operate in the manner substantially as and for the purpose set for th.

53,646.—Bleaching Stained Cotton.—James A. Meany, Brooklyn, N. Y.:

I claim the process of cleaning and bleaching stained cotton by passing it through solutions of soda ash and of chloride of lime, and rinsing it after each operation in cold water, and in vinegar and water, in the proportions and manner substantially as herein described and for the purposes set forth.

53,647.—Machinery for Shaving Wood Screws.—Dustin F. Mellen, New York City. Antedated, March 14, 1866:

I claim the inclined hopper having a channel of polygonal form at the base, to receive the blanks from the hopper, as and for the purpose described.

I also claim the employment of pins, r, working on sliding plates in the disk, fig. 6, and sweeping around in the polygonal recess in the hopper to carry around the screws therein, substantially as described.

I also claim the cylinder, t', grooved as herein specified, and the fingers, x, in combination therewith, as and for the purposes described.

I also claim the curved spout, y, and spring jaws, z, for delivering the screw blank to the feed arm, a', as herein specified.

I also claim the feed arm, a', and the apparatus connected there with, for receiving the screw blank from the jaws, z, and delivering it to the spindle, c', constructed, arranged and operated substantially as and for the purposes herein set forth.

I also claim the adjustable shaving apparatus gaged and operated as herein specified.

I also claim the revolving cross arm, f', and spring claws, or their equivalent, for stirring up the screw blanks in the hopper of the feed apparatus, for the purpose set forth.

53,648.—Machine for Nicking Screws.—Dustin F. Mellen, New York City. Antedated March 21, 1866:

I claim the combination of the piston rod, d, and directing forceps, p, employed with the feeding apparatus as described for feeding the screw blanks to the gripping dies, as specified.

I also claim the gage plate, S, to determine the exact radial projection of the screw blank from the face of the dies when brought to the cutter in combination with the gripping dies, c, herein described.

I also claim the vibrating adjustable frame, l, in combination with the holding dies, as and for the purposes described.

I also claim the combination of the friction clutch, w, spring, y, ratchet and stop, v2, for setting the clamps accurately, as herein specified.

53,649.—Handle for Milk Cans, Etc.—Charles Miller, Utica, N. Y.:

I claim in combination with a milk can, the handles, C and d, constructed and applied substantially as described, whether the handle, d, be hinged at h, or be made solid and immovable at its connections, h and L.

53,650.—Machine for Cutting Files.—George Miller, New York City:

I claim, First, The combination and arrangement of the chisel stock with the recoil springs, socket bearing and springs connected with the adjustable transom, operating substantially as and for the purpose herein shown and described.

Second, The combination and arrangement of the spindles, B J, with the feed motion, chisel stock, and rack and pinions, or their equivalents, as specified, and operating substantially as and for the purpose herein shown and described.

53,651.—Railway Signal.—Patrick Francis Milligan, Washington, D. C.:

I claim in combination with the frame work, on both sides of the railroad track, the chairs, S and X, and their supporting pulleys and bolts, whereby they are attached to the timber supports beneath the railroad track, the whole constructed and arranged as herein described and set forth.

53,652.—Washing Machine.—Henry C. Moody, Fulton, N. Y.:

I claim the arrangement, construction, and combination of the levers, G, the self-adjusting rubber, F, the side rollers, E, and guides, D, as herein described and for the purposes set forth.

53,653.—Harvester Rake.—C. Moul, Hanover, Pa.:

I claim, First, Applying the rakes and the reel arms to short radial shafts, g', all of which have independent movements of each other upon a revolving crown wheel, d, substantially as described.

Second, Giving an intermittent oscillating motion to each one of the shafts, g', by means of tootned segments, h, and fixed segments, G L, said segments being constructed with flat bearing surfaces, h' t2, t4 for holding the rake and reel arms whilst passing over the platform and also over the draft frame, substantially as described.

Third, The combination of the anti-friction roller, t', with the plane surface, t2, of the toothed segment, L, and the flat surfaces of the oscillating segments h, substantially as described.

Fourth, The combination of the upper and lower toothed segments with the intermediate revolving crown wheel, d, and the independent oscillating shafts g', substantially as described.

Fifth The construction and arrangement of the segments h h', substantially as described.

53,654.—Broom Head.—Jacob H. Mumma, Harrisburgh, Pa.:

I claim the combination of the jaws, B B, with the case A, one of

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the said jaws being hinged to the case as represented and one provided with an arm and the other with a sleeve, substantially as and for the purpose herein specified.

Second, The bars C C and D D, constructed so as to form a joint for expanding to suit the broom.

Third, The combination of the jaws, B B, with the bars, D D and C C, when constructed and used as and for the purpose herein specified.

53,655.—Stopper for Bottles.—L. B. Myers, Elmore, Ohio:

I claim, First, The discharge spout, A, constructed substantially as specified, whether it be independently made and fitted to the article with which it is used, or formed with the article as a part of it, substantially as specified.

Second, The cap, C, in combination with the spout, A, applied substantially as and for the purpose specified.

53,656.—Method of Deodorizing Petroleum.—Robert Newall, Marietta, Ohio:

I claim deodorizing petroleum, and other hydro carbons by treating and washing them with a solution of lye containing chloride of lime, soda ash, and common lime, or their several equivalents, in the proportions above stated, substantially as above described.

53,657.—Press.—William Norman, New York City:

I claim the toggle joint, H G, slots or guides, g, pulleys, J K, axels, I and a, spur wheels, d f, and cords or ropes, L N R, all arranged with reference to each other and to the pressing box, C, substantially as herein set forth, and for the purpose specified.

53,658.—Apparatus for Refining Iron.—John W. Nystrom, Philadelphia, Pa.:

First, I claim the herein described method of an apparatus for refining metals so that the oxidizing blast shall be admitted into the converting furnace under the molten mass, at elevations with respect to the surface of the metal, higher, as the work of refining progresses, as set forth

Second, In a converting furnace constructed and operating as herein described, I claim forming the tuyeres of an oblong or rectangular sectional area at the point where they enter the furnace, substantially as and for the purposes set forth.

Third, In a converting furnace constructed and operating as herein described, I claim forming the tuyeres of a curved form, substantially as and for the purposes herein set forth.

Fourth, The combination with the converting furnace constructed and operating as herein described, of cranks and friction wheels, substantially as and for the purposes specified.

Fifth, The employment in connection with a converting furnace, constructed and operating substantially as herein described, of movable ingot molds, so as to allow of their being brought under the furnace, in the manner and for the purposes set forth.

Sixth, Forming the ingot molds of Z-shaped pieces, substantially as and for the purposes specified.

Seventh, Clamping the molds together successively, substantially as and for the purposes herein explained.

Eighth, The lining of the inside of the converting vessel and also of the ingot molds, with a composition of silicate of oxide of iron and fire clay or plumbago, as described.

53,659.—Stopper for Jars and Bottles.—Thomas O. Oliver, New York City:

I claim the combination of the eccentric, A, with arm, a, attached, with the staple, C, firmly attached to the lower disk, E, of the stopper, substantially as described, and for the purpose set forth.

53,660.—Horse Hay Fork.—John K. O'Neil, Kingston, N. Y.:

I claim the right-angled or bent lever, D, for producing the sliding movement, of the slide bars on the main bar, to open and close the barbs, B B, arranged and operating substantially as herein specified.

I also claim the arrangement and combination of the operating tackle and angular lever in such a manner as to shift the suspension of the instrument from one arm of the angular lever to the other, substantially as and for the purpose herein specified.

I also claim the jointed hook, H, constructed, arranged and operating in combination with the angular lever and operating tackle, substantially as and for the purpose herein set forth.

53,661.—Machine for Blocking and Shaping Hats.—George Osterheld and Rudolf Eickemeyer, Yonkers, N. Y.:

First, We claim the bending shell, H, applied and operating in combination with the hat block, D, and with suitable means of holding the brim of the hat, substantially as and for the purpose herein described.

Second, We claim so applying the holding plates for clamping the brim of a hat in a hat-shaping and blocking machine, that they are opened and closed automatically by the operation of the machine, substantially as herein described.

Third, We claim so applying and operating the banding shell and the holding plates as to produce the over-stretching of the hat-body in hight or depth, preparatory to the entrance of the block, substantially as herein specified.

Fourth, The banding ring, b, applied within the holding plate and operating in combination with the banding shell, H, substantially as herein described.

Fifth, The tip flattener applied and operating in combination with the hat block, substantially as herein specified.

Sixth, Making the tip flattener with a convolute face, substantially as and for the purpose herein set forth.

53,662.—Implement for Setting out Plants.—Edmund W. Packer, Paulsborough, N. J.:

I claim the combination of the shaft, A, tongs D D, and ram, F, when arranged together so as to operate substantially in the manner described, for the purpose specified.

53,663.—Cultivator.—C. S. Pangborn and George W. Beers, Onargo, Ill.:

We claim the combination of the treadles, L L, plow beams, G G, swivel sockets, H H, arms, J J, treadles, O O, and frame, D, constructed and arranged to operate in the manner as and for the purpose herein specified.

53,664.—Horse Power.—George Partridge, St. Louis, Mo., and David M. Johnson, Coshocton, Ohio:

We claim the master wheel, B, and sweep, C attached to the upright shaft, A, in combination with the horizontal shaft, E, provided with the level pinion, D, and the crank pulley, F, connected with the walking beam, G, all arranged to operate in the manner substantially as and for the purpose set forth.

We further claim in combination with the parts above specified, the horizontal shaft, I, arranged with an eccentric collar, K, or its equivalent, for the purpose of throwing the pinion, J, in and out of gear with wheel, B, substantially as and for the purpose set forth.

53,665.—Weft Bobbin.—Oliver Pearl, Lawrence, Mass.:

I claim the combination of the enlarged or bulbous end of a filling bobbin with the barrel of the bobbin, as herein described and for the purpose set forth.

In combination with the enlarged end of the bobbin, I claim the grooves or rings cut into the barrel at intervals to prevent the yarn from slipping from the bobbin, when in motion in the shuttle.

53,666.—Dental Vulcanizing Heater.—D. J. Peer, Rochester, N. Y.:

I claim two or more clamping bolts, B, in combination with the head and boiler of dentists' vulcanizing heaters, said bolts being constructed, arranged, and operating substantially in the manner and for the purposes herein shown and described.

53,667.—Vulcanizing Flask.—D. J. Peer, Rochester, N. Y.:

I claim in combination with the nowell, N, plate, P, cope, B, or its equivalent, the swinging or pivoted bolts, b, arranged and operating substantially in the manner and for the purposes shown and described.

53,668.—Secondary Electric Pile.—Geo. G. Percival, Brooklyn, N. Y. Antedated March 9, 1866:

I claim the forming of the electrodes of a secondary pile of layers of gas carbon or some other conducting power, substantially as and for the purpose hereinbefore described,

53,669.—Electrical Lamp.—Geo. G. Percival, Brooklyn, N. Y. Antedated March 9, 1866:

First, I claim the attachment to a lamp or to the base or fixtures thereof, of a secondary pile which will store up and retain galvanism until given off from time to time as may be required, for the purpose of lighting the lamp, substantially as hereinbefore described.

Second, The attachment to a lamp or to the base or fixtures thereof, of a helix of insulated wire, or its equivalent, forming part of the primary circuit of the secondary pile, when this helix is used to increase the spark produced by breaking this circuit, and the spark is used to light the lamp

53,670.—Sawing Machine.—Charles L. Pierce, Buffalo, N. Y.:

I claim supporting a drag saw bar, A, at its rear end by a rocking slide bar, C, whose axis is in line with the axis of the driving crank, in the manner and for the purpose set forth.

Second, The combination of the slide bar, A, arranged as stated, with the driving crank and slotted cross head, in the manner and for the purpose set forth.

Third, Supporting the saw bar, A, at a point between the driving crank and saw by the adjustable guide box, E', and adjusting rack frame, F, and pinion, F', for the purpose and substantially as described.

Fourth, The combination of the windlass, I', and friction clutch, L5 L6, with the pulley, K, sliding chock, H', and buffer guide post, L, arranged and operating in the manner and for the purpose set forth.

53,671.—Spring Lever Clasp.—Gustavus D. Pike, Chatham, Conn.:

I claim the employment of the spring lever, 2, and the ears, d d and the teeth, E E E, or their equivalents, combined with the strap-hole, a, and the riveting of clasp to strap, for the purposes specified.

53,672.—Tree Protector.—Joseph L. Piper, Winthrop, Mass.:

I claim the said improved tree protector, as made, of the platform to be applied to the trunk of a tree, and with the strips of glass arranged in such platform, substantially in manner as hereinbefore set forth.

I also claim the platform, as made, with the rebate and the saw kerf or recess arranged on and around it, substantially in manner and for holding the plates of glass, as specified.

53,673.—Railway Frog.—Peter Quinn, Philadelphia, Pa.:

I claim a frog rail or rails adapted to the main rails of a railroad and to those of turnout, and operating substantially as and for the purpose herein set forth.

53,664.—Railway Switch.—Peter Quinn, Philadelphia, Pa.:

I claim the switch rails, D and D', when connected and operating together, as described, and when the inclined switch rail, D, bears on the top of the main rail, A, when it is necessary to transfer the cars from the main track to the turn-out, all as set forth.

53,675.—Combined Switch and Frog for Railways.—Peter Quinn, Philadelphia, Pa.:

I claim the combination, substantially as described, of the movable frog rail, G, arranged to rest on one, of the main rails with any suitable switch rails, the whole operating together as set forth.

53,676.—Water Elevator.—Geo. Race, Norwich, Conn.:

First, I claim a water elevator having a supplementary frame operated and constructed as shown and described.

Second, In combination with the supplemental frame, I claim the system of gearing, as shown, and so arranged and operated that the bucket can be lowered rapidly by a forward movement of the crank.

Third, In combination with the supplemental frame, I claim the brake lever, the hand rest, the spring pawl, and the adjustable friction band, all constructed and arranged as described and for the purpose set forth

53,677.—Cooler for Brewing and Distilling.—Ludwig Reich, New York City:

I claim the pan, E, tubes, F, end box, G, communicating with each other and provided with the cold water vessel, A, and with or without the ice chamber, J, all arranged substantially as and for the purpose herein set forth.

53,678.—Box for Cigar Fuses.—Henry Reiman, Brooklyn (E.D.), N. Y.:

I claim the box with two compartments, and with a sliding lid and stops so constructed and arranged as to permit either compartment to be opened, but to prevent both from being opened or uncovered at the same time, substantially as herein described.

53,679.—Lamp Extinguisher.—Wm. A. Richardson and Henry D. Ward, Worcester, Mass.:

First, We claim the two wings, r, combined and arranged in relation with each other and with the wick tube of the lamp, substantially as herein set forth, for the purpose specified.

Second, The elastic construction of the lower parts of the said wings, r, for the purpose of holding them apart, substantially as described, until the flame is to be extinguished.

Third, The combination of the shafts, u, arms, c and c', and elastic wings, r, substantially as herein set forth for the purpose specified.

Fourth, The catch, w, in combination with the arms, c and c', and wings, r, substantially as herein set forth for the purpose specified.

53,680.—Cut-off Valve Gear.—John T. Rich, Philadelphia:

First, I claim actuating the cut-off valve of a steam engine positively, both in opening and closing through the medium of a toggle joint and multiplying the motion thereof, substantially as set forth.

Second, So combining the governor and cut off valve of a steam engine by means of a bell crank, F, lever, G, and other connecting mechanisms, as set forth, that the valve may be operated by the governor in connection with and independently of the toggle joint, E, substantially as set forth.

Third, The connecting rod, D, toggle joint, E, bar, m, link, L, and lever, G, in combination with the stud, H, valve stem, N, and valve, I, the parts being constructed and arranged substantially as and for the purposes set forth.

Fourth, In combination with the cut-off valve stem, N, the stud, H, constructed substantially as set forth.

53,681.—Bag Holder.—S. S. Rockwell, Lansing, Mich.:

I claim the shield, D, in combination with the springs, E, when used for the purpose of a bag holder, in the manner and for the purpose herein described.

53,682.—Apparatus for Cooling Beer.—William Rose, St. Louis, Mo.:

I claim the process of forcing air through the liquid, thus bringing the liquid in close contact with the air and reducing the temperature of the liquid to the temperature of the air forced through it.

53,683.—Lathe Chuck.—Richard Rothwell, Dover, N.H.:

I claim the conical-shaped lathe chuck, a, having a series of longitudinal grooves or depressions, d d, upon its periphery, substantially as and for the purpose specified.

53,684.—Tackle for Raising Sunken Whales and other Bodies.—Thos. Welcome Roys, New York City:

First, I claim the yielding connecting link, substantially as illustrated in figures 1 and 2, introduced between the suspension rope and tackle block or in the suspension rope on either side of the blocks, substantially as shown and described.

Second, The use of a weight working within guides in combination with the said spring or springs, as above, substantially in the manner and for the purposes hereinbefore described and set forth.

Lastly, The combination and use of the two horizontal bars or axles, B B', with the grooved pulleys, plain or fluted rollers, C, and india-rubber rings or endless bands, D, and suspender braces, E, substantially in the manner and for the purposes hereinbefore described and set forth.

53,685.—Fruit Jar.—George H. Russell, Dickinson, Pa.:

First, I claim forming one or more inclined ways or planes, with notches at their lowest points upon the cover of a fruit jar, can or other similar article, in combination with one or more fixed studs at the mouth of the jar, substantially as described and for the purpose specified.

Second, Hermetically sealing fruit jars, cans or other similar articles, with a composition of rosin and tallow, substantially as herein described.

53,686.—Boring Artesian Wells.—Anton Saffer, New York City:

First, I claim the intermediate guides, b, arranged in the joints or couplings of the tube, B, and adapted to mutually steady the parts, B and C and allow an ample passage for the fluid or partially fluid matter rising between them substantially as specified.

Second, I claim the wheel, E, with its grooves, e', and wiper, F, arranged to operate relatively to the cutters, B* B**, and their connections, substantially in the manner and for the purpose herein set forth.

Third, I claim in connection with the above the conical or tapered upper surface of the part, E, and levers, H, arranged to operate together alternately lifting and liberating the cutters, B* B**, and their connections, substantially in the manner and for the purpose herein set forth.

Fourth, I claim the cutters, B* B**, arranged transversely in combination with the braces, B***, and with suitable reciprocating mechanism for well boring, substantially as herein set forth.

Fifth, I claim the hollow screw, I, or its equivalent, adapted to regulate the motion of the cutters, B* B**, substantially in the manner and for the purpose herein set forth.

Sixth, I claim the shoulder, b*, arranged relatively to the screw threads and cutters and tubular stock, substantially in the manner and for the purposes herein set forth.

53,687.—Sound-boards to Pianos.—P. Schulor, Philadelphia, Pa.:

I claim the application of a metallic plate, E, constructed substantially as described, to the underside and directly beneath the treble portion of the bridge, C, of the sound board of a piano, substantially as and for the purpose described.

53,688.—Tanning.—Judson Schultz, Ellenville, N. Y.:

I claim the treating of hides or skins with saw dust, substantially as herein described.

53,689.—Shoe Brush.—H. E. Scotchmer, Chicago, Ill.:

I claim a pocket or traveler's blacking case provided with a brush having the handle and small brush detachable, and a blacking box, arranged to pack within the case, substantially as shown and described.

53,690.—Mold for Casting Flanged Pipe.—George T. Sheldon, Chelmsford, Mass.:

I claim the use and application of the squaring blocks, D D, and the cores, f, for the purpose of squaring or finishing the ends of flanged pipes, and forming the bolt holes, in the process of casting the same, substantially as specified.

53,691.—Skeleton Skirt.—S. J. Sherman, Brooklyn, N. Y.:

First, I claim the within-described hinge joint on the ends of the hoops, the same being rigid in the vertical direction, and adapted to yield inwardly, but prevented from yielding outwardly, by extending the one part past the axis of the joint so as to bear against the other part, substantially in the manner and for the purposes herein set forth.

Second, The three hinges arranged at the sides and front of the skirt hoop and capable of yielding inwardly but not outwardly, so as to allow the skirt to be compressed inwardly at any of those points without protruding outward at either point beyond the general circuit of the hoop, substantially in the manner and for the purposes specified.

53,692.—Beer Faucet.—Emil Sirret, Buffalo, N. Y.:

I claim forming beer or other liquids any degree desired previous to their being drawn, by constructing a hollow room or reservoir within an ordinary faucet between the cross pin and the end to be tapped in the barrel, to be operated into by the syringe, E, for the purpose and in the manner set forth.

53,693.—Sirup Filter.—James L. Smith, Tuscola, Ill.:

I claim the arrangement of sieves, D and B, the body and the braces, C C C, in the manner and for the purpose herein specified

Second, The wood, F, in combination with the body, A, and sieves, D and B, when used as and for the purpose herein specified.

53,694.—Threshing Machine.—John P. Smith, Hudson, N. Y.:

First, I claim the concave provided with semi-spheroidal projections or threshing teeth, n, substantially as and for the purpose herein set forth.

Second, The deflecting board, F, so applied to the rear end of the machine as to deflect the threshed straw downward, substantially as and for the purpose herein set forth.

Third, The relative arrangement of the inclined board G2, the ribbed threshing cylinder, B, and the concave, D, substantially as herein described, whereby special feeding contrivances are dispensed with.

53,695.—Process of Generating Gases to be Used for Motive Power.—Daniel E. Somes, Washington, D. C.:

First, I claim the apparatus for generating steam or gas to be used as a motive power, substantially as described.

Second, Combining and using the ingredients herein described, substantially as and for the purpose set forth

53,696.—Machine for Stripping Sorghum.—John M. Spencer, of Ottawa, Ill.:

I claim the arrangement shown and described of the toothed endless apron, B, the toothed cylinder, C, slotted plate, C, feed rollers, E E', and supports or table, J J.

53,697.—Laundry Stove.—Horatio Squyer, Rochester, N. Y.:

I claim the combination and relative arrangement of the furnace, H, having inclined planes or oblique sides, I, with the cauldron, D, as shown and described, the furnace being below, and in front of the cauldron, which latter is encased with a fire jacket, A.

53,698.—Spoke Shave.—John G. Steiger, Cleveland, Ohio:

I claim the special construction of the cast handle and clamp with the shoulder, b, formed between the clamp and the handle blade, B, and set screws, d, and operating substantially as described.

53,699.—Piping for Boots and Shoes.—Charles Stone, Stoughton, Mass.:

I claim as a new article of manufacture, a piping or binding for boots and shoes, having a rounded edge or nearly so, substantially as described.

53,700.—Telegraph Cable.—James Story, Paris, Ky.:

First, Constructing marine telegraph cables with a steel plate provided with projections upon its edges, for securing a platting of hemp cords, in the manner and for the purposes described.

Second, I claim the application and use of hemp cords or other equivalent substances in combination with a steel plate to support and take the tension off from the insulated conducting wires in marine telegraph cables

Third, I claim the use of hemp cords in plats or other equivalent substances, in combination with a steel plate, when encased, and the joints secured as herein described.

Fourth, I claim supporting a series of curved conducting wires, in partition walls, placed in the cables at certain determined distances, and which are constructed and secured in the manner herein described for the purposes specified.

Fifth, I claim the elastic straps, e e, the same being placed so as to give support to the outer covering and secured to it, and the partition walls, in the manner and for the purposes described.

Sixth, I claim providing a marine telegraph cable with air chambers, constructed substantially as and for the purposes herein specified.

53,701.—Rail road Rail.—Zadok Street, Salem Ohio:

I claim the combination of animal charcoal, vegetable charcoal or other carbonaceous material, such as animal oil or tallow and prussiate of potash, in about the proportions specified, and for the purpose of hardening railroad rails, as set forth.

53,702.—Umbrella.—George Styles, New York City:

I claim the telescope tubes, a b, with holes k l m, in combination with the spring catch j, and runner, e, of a parasol, constructed and operating substantially as and for the purpose described.

Also the trigger spring n, in combination with the catch, j, runner e, and tubes, a b, substantially as and for the purpose set forth.

53,703.—Curtain Fixture.—John B. Tarr, Chicago, Ill.:

I claim the arrangement of the lower roller, B, endless cord, b b, curtain, a a, attached to the endless cord, and tension roller, c', substantially as set forth.

53,705.—Mop Head.—Levi H. Thomas, Waterbury, Vt.:

I claim the handles or guards, E E, on the wire, D, substantially as and for the purposes herein set forth.

53,704.—Clothes Drier.—Samuel I. Trask, Guilford, N. Y.:

I claim, First, The combination with the side frames which contain the bars for sustaining the clothes, and which are hinged together at the top of the latches, D and E, substantially in the manner and for the purpose set forth.

Second, The combination with the said side frames, constructed as described, of the shoes, G, and rollers, F, the said shoes and rollers being on the same end of the clothes drier, as and for the purpose herein above specified.

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53,706.—Bed Bottom.—Edward W. Tucker, Lowell, Mich.:

I claim, First, The bar, H, with cogs, a a, and rack bars, b b, when arranged in the manner and for the elevating or lowering the head of a bed bottom, substantially as and for the purposes specified.

Second, The bars, D, and bars, F, with springs, E, in combination with the springs, B B, rails, C, arranged substantially as and for the purposes herein set forth.

53,707.—Slide Valve for Steam Engines.—Reuben D. Turner, New York City:

I claim the hollow piston, E, cylinders, C C, and inner valve chest, B, in combination with each other, and with the valve, D, and outer chest, A, substantially as and for the purpose herein specified.

53,708.—Balance Slide Valve.—A. E. Vanbebber, A. Salle and J. Britton, Fulton, Ill.:

First, We claim the combination with a steam engine valve, C, of the suspension rod, E, balancing piston, D D P, and guide, O, all constructed and arranged to operate as and for the purposes specified.

Second, The combination of the spring G, and temper screw, I, as and for the purposes specified.

Third, The guide H, projecting inward over the edge of the piston, D, to act as a guard to prevent the blowing out of the piston, in the manner described.

53,709.—Burning Fluid.—Aaron C. Vaughan, Rainsburg, Pa.:

First I claim treating benzine with common resin, in the manner and for the purpose set forth.

Second, A burning fluid composed of benzine treated with resin and mixed with ordinary illuminating oil, as set forth.

53,710.—Corn Harvester.—J. M. Wallis and Elias Miller, Milton, Iowa.:

We claim the bar, D, passing through the shaft, M, and arranged in relation with the arms, J, substantially as and for the purpose pecified.

53,711.—Construction of Pulleys.—A. Warth, Stapleton, N. Y.:

First, I claim the working face or faces of a pulley of one or more layers of india-rubber or other soft and elastic material, covered with leather or other flexible material, substantially as and for the purpose described.

Second, The combination and arrangement of the adjustable disks, a a, india-rubber plates b', leather faces, d, and intervening metal plate, e, all constructed and operating substantially as and for the purpose described.

53,712.—Egg Holder.—Franz Wegrather, Chicago, Ill.:

I claim the cup formed in sections as shown and provided, with the cup, A, and spring, B, all arranged to operate as and for the purpose set forth.

53,713.—Harvesting Machine.—Thomas Welch, Churchville, N. Y.:

First. I claim the pitman, P, and set nuts in harvesters in combination with the head or case, A, whereby the wear of the boxes, b and b', may be compensated for.

Second, The use of the swivel nut, E, constructed, arranged and operating substantially in the manner and for the purposes set forth.

Third, Securing the head or case, A, and boxes, b and b', to the crank pin, O, of harvesters, by means of the groove c, and rib, e, substantially as shown and described, and for the purposes set forth.

53,714.—Ladies' Fan.—Thomas Welham, Washington, D. C.:

First, I claim a fan so constructed in relation to its handle that the fan and the handle may be adjusted in line or at any desired angle, substantially as described.

Second, So pivoting said fan as to permit it to revolve upon the handle, whether fixed in line with the handle or set at any angle, all substantially as described.

Third, In combination with such adjustable or revolving fan, a casket in the handle thereof, substantially as described.

Fourth, In combination with such adjustable or revolving fan, the weighted extremities of the fan or feathers thereof, substantially as described.

53,715.—Boring Artesian Wells.—Daniel Wheeler, Decorah, Iowa:

First, I claim the combination of stop, F, catch, A, and ratchet, B, in combination with rollers, B and E, or any equivalent contrivance, working substantially as described.

Second, The cog wheel, A N, with the square hole, A B, for the drill rod to work in, in combination with the moving dog, C, stop dog, F F, and spring, E, connected with d g, C, or any equivalent contrivance working substantially as described

53,716.—Roofing Cement.—Warren P. Wheeler, Waterloo, N. Y.:

I claim the composition of matter above described for covering roofs of buildings, together with the process of applying the same, as set forth in the above specification.

53,717.—Belted Friction Gearing.—James D. Whelpley, Boston, Mass.:

I claim the belted friction gearing consisting of friction drums, A B, belt pulleys, a' and b', and belts, d d', arranged, combined and operated substantially as described and for the purpose stated.

53,718.—Apparatus for Separating Ores.—James D. Whelpley and Jacob J. Storer, Boston, Mass.:

First, We claim the secondary hopper, in combination with the main hopper, and opening into it and into the open air by valves to be employed alternately, substantially as described.

Second, The door, c, and its rod, g, in combination with partition, b, substantially as and for the purpose described.

Third, The valves, e e' e'', constructed respectively with their openings, k, of the same size and shape as the open area of the bottom of the cavity to be closed, in combination with the bottom of the hopper and the dust-tight felt packing, substantially as described.

53,719.—Scissors.—Luther G. White, Waterbury, Conn.:

I claim forming a shoulder upon the handles of scissors or shears so that a recess shall be left between the same and the blades when riveted thereto, for the purposes herein specified.

53,720.—Smut Machine.—S. B. Williams, Wheeling, West Va.:

I claim the combination of the perforated concave, D, fan, J, below said concave, the beaters, U, air regulator, K3, and air conductors, W X Y, all arranged as hereinspecified to force the air in separate downward currents within, around and outwardly through the perforated walls of the concave, the external current being governed by the regulator, K3, and all the currents mingled with the dust in the fan case below.

53,721.—Steam Gage.—Charles A. Wilson, Cincinnati, Ohio:

I claim the air chamber, A, whose upper part communicates by a pipe, B, with the boiler steam space, while its lower part communicates by a pipe, D, with a diaphragm chamber of a steam pressure gage, and its extreme bottom by a pipe, C, with the boiler water space or devices, substantially equivalent, for the purpose set forth

53,722.—Hollow Auger.—Arcalous Wyckoff, Elmira, N. Y.:

I claim the cutters, A A, constructed with two or more alternately projected cutting points, C and D, so arranged as to cut in parallel but concentric planes, substantially in the manner and for the purpose set forth.

53,723.—Postage and Revenue Stamps.—William C. Wyckoff, Brooklyn, N. Y.:

I claim coating the side of the paper which is to receive the print of the postage or revenue stamp, with a surface of water-color pigment or paint, or some sufficiently opaque or non-transparent surface as to receive a good impresssion from types or plates, and at the same time be seluble in water or other fluid, substantially as described.

53,724.—Stove Blacking Cutter.—William W. Armington, Meriden, Conn., assignor to himself and Stephen L. Usher, New Haven, Conn.:

I claim the follower, E, and the cutter, D, constructed and arranged to operate substantially in the manner herein described, in combination with the pan, A, or its equivalent for the purpose specified.

53,725.—Saw-grinding Machine.—John G. Baker (assignor to Henry Disston), Philadelphia, Pa.:

First, I claim the combination with a grindstone, J of a segment, G, for holding a saw blade on its concave surface, to which segment a vibrating motion in the arc of a circle having a fixed center is imparted by the mechanism described, or any equivalent to the same, for the purpose specified

Second, The combination of the rock shaft, B, rods, d d, segment, G, or the nuts, f f, or their equivalents, for adjusting the said segment on the rods.

Third, The combination of the reversible, pulley, F, belt or band, E'', and segment, G.

Fourth, The combination of the segment, its set screw, h, the sliding piece, i, and its set screw, h', and spring lever, i', the whole being arranged for the retention and release of the saw blade, substantially as and for the purpose herein set forth.

Fifth, The combination of the segment, G, and its adjustable dogs, k and k'', with the devices herein described, or the equivalent to the same, for shifting the driving belts.

Sixth, The grindstone dresser, composed of a number of disks, s, with pointed teeth, adapted to the sliding spindle, Q', and operating substantially as and for the purpose herein set forth.

Seventh, The screw shafts, N N, having threads of different pitches, those of one pitch controlling the position of the grindstone, and those of the other pitch controlling the position of the dressing device, all substantially in the manner and for the purpose herein set forth.

53,726.—Check Hook.—Charles A. Ball (assignor to himself and Thomas Livey), New York City:

I claim the spring-check rein hook attached to the socket or plate, a, by the fulcrum pin, d, and provided with the moving end, x, that closes against the socket or plate, a, as and for the purposes specified

53,727.—Curtain Fixture.—John H. Barnes and Thomas W. Brown, Brooklyn, N. Y.:

We claim the described device for holding and tightening the cords of window shades, etc., consisting of the plate, A, with the hook, B, or its equivalent, for taking the cord, such plate and hook being so arranged as to have motion up and down upon the screw by which they are held to the casing,

53,728.—Keyboard for Organs, Etc.—Moritz Baumgarten (assignor to himself, Jacob Heller, G. C. Clark, A. S. Keeler, and Morris Steinhart), New Haven, Conn.:

I claim constructing and combining two banks of keys substantially in the manner and for the purpose herein set forth,

53,729.—Inkstand.—Hezekiah Bradford (assignor to Horatio Bogert), New York City. Antedated March 30, 1866:

First, I claim a stationary cork or yielding stopper with or without a tapering or inclined end against which the pen comes in contact when it is dipped into the ink, as set forth.

Second, I claim the combination of the stopper, e, well, b, and fountain, c, as and for the purposes specified.

Third, I claim the fountain, c, and well b, in combination with a stopper in the bottom of the inkstand as set forth, whereby the fountain may be filled when the inkstand is inverted, as specified.

53,730.—Clamp Pulley.—Rufus Chandler, Springfield, Mass., a signor to himself and M. S. May, Milford, Mass.:

I claim a clamp pulley having sections, A and B, with dove-tail connections therewith, as described, and a roll, e, all constructed, combined and arranged substantially as herein specified.

53,731.—Rotary Steam Engine.—John Collicott (assignor to self and Otis Marshall), Boston, Mass.:

First, I claim the pistons, D D when formed in one piece with or immovably fixed to the rotary cylinder, and provided with packing strips acted on by the pressure of the steam, substantially as and for the purposes herein set forth.

Second, I claim the steam chest with its rotating balance valve, in combination with the steam ports and channels of a rotary steam or air engine, when arranged so that the steam shall be allowed to impinge directly upon the pistons in the center of their lengths, and at right angles, or nearly so, with their surfaces.

Third, I claim the hinged valves extending from end to end of the cylinder, when formed at their ends, to pack against the shoulder, c', on the cylinder heads by the pressure of the steam, as described

53,732.—Cooking Stove.—John B. Crowley (assignor to Chamberlain & Co.). Cincinnati, Ohio:

First, I claim a fire back of a cooking stove composed of two or more overlapping or rebated plates, F F, secured at the midwidth of the stove, while permitted unrestricted elongation toward the sides of the stove, substantially as set forth.

Second, The hollow perforated stand or rest, H, in combination with a center plate, perforated at its middle portion, substantially as set forth.

Third, A stand or rest having a circular or other symmetrical head which fits a corresponding view on the under side of the center plate, for the purpose of support and reversal, as explained.

Fourth, The arrangement of depressed hearth plate, L l l, flaps, eccentric legs, m, hook, N, and eye, O, as herein described.

Fifth, The jamb plate, G g, formed and arranged in the manner and for the purpose set forth.

53,733.—Horse Shoe Calking Vise.—William Delano (assignor to self and Walter H. Foster), Bangor, Me.:

I claim the new or improved horse shoe calking vise, made substantially as described, viz., of the vibratory bearer or plate, G, and the common vise having the jaws, A B, the whole being arranged and combined substantially in manner and so as to operate as and for the purpose specified.

53,734.—Corset Busk Clasp.—William Devines, Brooklyn, N. Y., assignor to Howell Smith, New York City:

I claim the attaching of hooks and eyes to garments by means of clamps, constructed and arranged to fit over and catch into slots in springs inserted in hems in the garment, the clamps passing through openings in the sides of the hems, substantially as herein shown and described.

53,735.—Grain Separator.—J. H. Fairchild, East Highgate, Vt., assignor to self and George L. Haywood:

I claim the lever, G, hammer, m, and spring, L I, in combination with the packing, j, and roller, p, when arranged and operating substantially as and for the purpose set forth.

I claim the adjusting screw, o, spring, L, shafts, f c, arm or wrist, J, in combination with the hammer, m, hung to the shaft, f lugs, g, and reel, as and for the purpose substantially as described.

53,736.—Hydrant Stop Cock.—Henry L. Frailey (assignor to self and Christian G. Herr), Lancaster, Pa.:

I claim a stop cock, the barrel, C, of which is provided with three pipes, D' E' F, opening into the chamber, and the key, B, with a hollow central portion communicating by apertures, 1 2, with the pipes, D' E', and by its perforation, 3 4, with pipes, F' E, arranged and operating in the manner and for the purpose specified.

33,737.—Ditching Machine.—Conrad Freese, Aurelius, N. Y., assignor to self and Frederic H. Lyon, Cayuga:

I claim the horizontal framing, A, and annular plat form, B, supported by or mounted upon rollers, c c' c'' c''', in combination with a rotary digger, M, operated by draught animals attached to sweeps, J, and walking around the platform, B, substantially as and for the purpose set forth.

The two rollers, c c', arranged or applied to the platform, A, substantially as shown and described, for the purpose of guiding or turning the machine, as set forth.

The placing of the shaft, N, of the rotary digger, M, in a rising and falling frame, H, arranged in connection with racks, a a, and a pivoted bar, R, or their equivalents, for the purpose of adjusting the digger to its work, substantially as described.

The construction of the rotary digger, M, as shown and described, to wit, of the circular plate, c, annular plate, d, with the buckets, e, between them, provided with cutters, e, at their outer ends and with bent inner ends, f.

53,738.—Bench Vise.—Richard Jones (assignor to self and Thomas Bromby), Paterson, N. J.:

I claim the eccentric or cam, B, or its equivalent applied to a bench vise, to operate in the manner substantially as and for the purpose herein set forth.

53,739.—Hay Spreader.—Luke L. Knight, Barre, Mass., assignor to J. E. Taylor, Sutton, Mass.:

I claim the combination of the shaft, D, provided with the clearers, E, and the revolving shaft, B, provided with the elevating fingers or tines, C, as and for the purpose specified.

53,740.—Harvester Rake.—Joseph D. Loveland, Wheatfield, Niagara, N. Y., assignor to Dayton S. Morgan, Rockford, N. Y.:

I claim the combintaion in a harvester of teeth or brushes on the reel ribs to sweep the grain upon the platform, with a vibrating sweep rake to remove it therefrom, the combination being and operating substantially as described.

53,741.—Leather Splitting Machine.—J. A. Marden, assignor to Samuel Vance and Albert E. Currier Newburyport, Mass.:

I claim the rotating cylinder, B, in connection with the reciprocating knife, S, arranged relatively with each other to operate in the manner substantially as and for the purpose set forth.

The pressure shoes, Y, in combination with the rotating cylinder B, and reciprocating knife, S.

The endless apron, U, in connection with the pressure, bar, W, shoes, Y, cylinder, B, and knife, S substantially as and for the purpose specified.

The placing of the cylinder, B, in adjustable bearings, substantially as shown when said cylinder is used in connection with the reciprocating knife, endless apron, pressure shoes and pressure bar substantially as and for the purpose set forth.

53,742.—Process for Desulphurizing Ores.—Melchor B. Mason, New York City, assignor to United States Mining and Ore Desulphurizing Company:

I claim the combination of lime, nitrate of soda and other equivalent alkaline substance, with pulverized or disintegrated ore in a raw condition, preparatory to the calcination thereof, all substantially in the manner and for the purpose herein set forth.

53,743.—Sewing Machine.—James S. McCurdy, Bridgeport, Conn., assignor to Elias Howe, Jr., Fairfield, Conn.:

First, I claim, a needle throat or die so constructed and arranged that it forms a guide for the needle throughout the whole depth of and below the shuttle case, and that its upper part presents above the work plate a rounded annular edge of such a character as to form a center between which and the pressing device or devices the cloth may be turned about a center in line or concentric with the axis of the needle, substantially as herein described.

Second, In combination with the throat, constructed and applied as above described, I claim the two independently but simultaneously acting pressure rollers, E E', applied and operating as herein specified.

Third, I claim the lever-like fingers, p, fulcrum, p', spring, s, and irregular shaped track, r r', in combination with each other and with the shuttle race and shuttle, substantially as and for the purpose herein specified.

Fourth, I claim the single-grooved friction roller, T, spring, U, and guide, w, applied in combination, and operating substantially as and for the purpose herein specified.

Fifth, I claim the attachment of the driving wheel or pulley to the main shaft of the sewing machine by friction, in the manner substantially as and for the purpose herein specified.

Sixth, I claim the spooler attached to the sewing machine by means of a spring, Q, applied and having its position controlled by a screw, s, substantially as and for the purpose herein specified.

53,744.—Griddle Cake Baker.—Jonas Mull (assignor to self, Ara D. Reed and J. R. Calkins), Troy, N. Y.:

I claim the employment of the inward and annular or surrounding flange or projection, A', of the surrounding rim, A, and its combination with the griddle cake baking sections, B and C, and flues or apertures, G, in the manner and for the purposes substantially as herein described and set forth.

I also claim the employment of the annular or surrounding chamber, a, and the combination thereof with the flues or apertures, G, and with the inner flange or surrounding projection, A', in the manner and for the purposes substantially as herein described and set forth.

53,745.—Knob Latch.—Wallace T. Munger (assignor to himself and J. A. Leggat), Bradford, Conn.:

First, I claim the combination of the latch bolt, C, the yoke H, and follower, E, substantially in the manner for the purpose specified.

Second, The combination of the horseshoe, F, link, I, spring, M, and latch bolt, D, substantially in the manner and for the purpose set forth.

53,746.—Machine for winding Yarns.—William Orr, Jr (assignor to himself and William Orr, Senr.), Clinton, Mass.:

First, I claim in machines for winding yarn, hanging the swift on a pivot at one side of the center of its length, or at one side of its center of gravity, so as to give it a pendulous character, substantially as described.

Second, I also claim passing the yarn on its way from the swifts to the quill between elastic rolls, arranged and applied substantially as and for the purpose above described.

Third, I also claim in combining in one machine devices for winding yarn from the swifts, and quilling the yarn, when the two operations are performed by such combination in one connected operation, by means of sockets, V, W, the guides, H, H, and the elastic rolls, m, substantially, as described.

53,747.—Machine for Holding and Grinding Edge Tools.—John Richardson (assignor to himself and Edwin Fernald), Turner, Maine:

I claim the improved machine constructed as herein before described, for holding and grinding chisels, plane irons and and any other tools requiring a like bevel, and any tool having an angular edge of like bevel, perfectly true and with entire accuracy to any bevel required, either acute or obtuse.

53,748.—Water Can for Railroad Cars.—Leon T. Richer (assignor to himself and Isaac L. Allen), New York City:

First, I claim the employment of the waste or unclean water chamber, L, in combination with the vertical connecting tube, K, and receptacle or box J, each being constructed and arranged in the manner, and for the purposes substantially as herein described and set forth.

Second, I claim the employment of the discharge water valve, D, in combination with the discharge pipe, C, and with the valve chamber, E'', each being constructed and arranged in the manner and for the purposes substantially as herein described and set forth.

Third, I claim the employment of the coil or spiral spring, E, in combination with the valve rod, d, upper connecting rod, F, lever, G, thumb piece, H, and with the tube E', each being constructed and arranged in the manner and for the purposes substantially as herein described and set forth.

53,749.—Attachment in Plows.—Milton Roberts, St. Pauls, Minnesota, assignor to himself and Nathan H. Roberts, Richfield, Minnesota:

First, I claim the attaching of the plow to the axle and wheels, in the manner substantially as and for the purpose herein set forth.

Second, I also claim the rod, J, pivoted to the axle, A, and provided with a hook, I, at its outer end in combination with the plow and the wheels and axle, substantially as and for the purpose specified.

Third, I also claim the wheel, B, provided with the concave flange, K, in combination with the plow, F, substantially as and for the purpose set forth.

Fourth, I further claim the rollers, N, placed in the frame, M, having the rods, O, O, attached in combination with the plow and the wheels and axle, substantially as and for the purpose specified.

53,750.—Pump.—H. M. Stoker (assignor to himself and J. C. Stoker), Watson, Illinois:

I claim the reciprocating pump cylinder, B, in combination with the fixed or stationary valvular pistons, E, F, and the abutment, F, placed or secured within the pump cylinder, and provided with the opening and valve with the eduction or force tube, G, communicating with said openings, substantially as and for the purpose herein set forth.

53,751.—Sheet-Metal Can.—George F. Stone (assignor to himself and J. H. Whithurst), Philadelphia, Pa.:

I claim the disk, A, which forms the end of a tinned plate vessel, and its groove, c, constructed as described for the reception of the edge of the body, D, when the whole is applied to a bath of molten solder, having its depth arranged in respect to the said disk and its groove, as set forth for the purpose specified.

53,752.—Hand Corn-Planter.—Salmon E. Tyler and Richard Tattershall (assignors to themselves and Jackson Simons), Anoka, Minnesota:

We claim the reciprocating head, E, rotating in the grooves, e e e,

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the adjustable recessed cylinder, D, graduating the grooves, j j j, in connection with the set-screw, H, when constructed substantially as herein set forth and described.

**53,753.—Cotton Gin.—Edward Alfred Cowper, Westminster, Great Britain:**

First, I claim the intermittent nipping or forcible holding of the fibre of the cotton very nearly close up to the seed by the holding instruments caused to approach at intervals, so as to nip or hold the fibre whilst the seeds are detached by another part of the apparatus.

Second, I claim the nipping-blade, A, roller, B, and beater, C, operating in combination in any manner, substantially as herein described.

**53,754.—Paring, Cutting and Coring Machine.—William Weaver (assignor to E. Price), Phœnixville, Pa.:**

First, I claim the curved serrated plate, e, in combination with the lever, F, and knife, d.

Second, The box, A, receptacle, A', tubes, J J' and K, and plates, i, i, the whole being arranged as and for the purpose described.

**53,755.—Rotary Engine.—Robert D. Wright (assignor to himself and L. B. Holland), St. Louis, Mo. Antedated March 21, 1866:**

I claim the employment of the plunge, b, in combination with the rotary piston, c f, all being constructed and arranged to operate substantially as herein described and represented for the purposes set forth.

**53,756.—Means of Protecting the Bottoms of Ships.—Cowper Phipps Coles, Ventnor, England. Patented in England May 21, 1864:**

I claim the combination of the exterior portions of structures that are liable to be submerged, with cement, by means of holding agents, the whole being combined, and operating substantially, as set forth.

**53,757.—Fire Alarm.—Charles Dion, Montreal, Canada East:**

I claim the spring, A, plate or tube, B, or other equivalents, as shown in the different modifications, in combination with the tilting lever, D, or its equivalent, and with the falling weight, F, or its equivalent, constructed and operating substantially as and for the purpose described.

**3,758.—Compressed Gas Generator.—Jules Gros, Paris, France:**

I claim the generator, d, provided with a revolving chambered cylinder or any equivalent device, in combination with the receiver, a, constructed and operating substantially as and for the purpose described.

**53,759.—Propelling and Steering Apparatus for Vessels.—Jonathan Jopling, Bishopwearmouth, England. Patented in England May 30, 1865:**

I claim the apparatus for propelling and steering vessels, consisting of a fan or fanner wheel, fixed on a vertical shaft, and made to rotate within a movable case, secured to a hollow shaft, the combination of the fan, and case, and shafts, being substantially such as described, and operating substantially in the manner set forth.

**53,760.—Muff.—Moritz Mahler, Hungary, temporarily residing in Montreal, Canada:**

First, I claim the muff provided with a covering of leather or other suitable material, without fur or hair on the side that comes next to the person, as and for the purposes set forth.

Second, I claim the muff formed wider at the bottom than at the top portions, so that the ends may be at an inclination, for the purposes and as specified.

Third, I claim rings or loops attached to the upper part of the muff, for the reception of the suspending cord, as set forth.

Fourth, I claim a pocket formed in the front portion of the muff and provided with a flap of skin or fur hanging from the top portion of the muff, down over the front part of the same, as and for the purposes specified.

**53,761.—Steam Generator.—Peter C. Moller, Leipsic, Saxony, assignor to Johann Tobias Rominger, Dresden, Saxony:**

I claim the combination of the cross-shaped blocks, L, water passages, K, elbows, M, jackets, O, tank, F, and coil, G, constructed and arranged relatively to each other in the manner and for the purposes herein represented and described.

**53,762.—Propeller for Vessels.—Ambroise Raphin, Paris, France:**

I claim the fly-wheel, C, mounted on two or more shafts, B, secured to the hull of a vessel, in combination with two or more parallel rods, D, and buckets, c, all constructed and operating substantially as and for the purpose described.

**53,763.—Apparatus for Burning Liquid Hydro-Carbons.—Alexander Schpakofsky and Nicholas Strange, St. Petersburg, Russia:**

We claim the method of, and apparatus for, burning the vapors of hydro-carbon fluids, substantially as herein shown and described.

**53,764.—Car Coupling.—A. B. and Frank S. Taft, temporarily residing in Montreal, Canada East. Antedated March 21, 1866.**

We claim the shackle, E, provided with the shoulders, d e, and fitted in the draw-head as shown, in connection with the pins, B B, provided with springs, C, and having rods, D, attached, all being arranged to operate substantially as and for the purpose set forth.

## REISSUES.

**2,217.—Process for Bleaching Fibrous Substances.—J. J. Eckel and Isaac S. Schuyler (assignees of Joseph Short), New York City. Patented Jan. 23, 1866:**

First, We claim washing or cleansing liquid, composed of potash or caustic soda, and the chloride of sodium, spirits of ammonia, or an equivalent substance, dissolved in water, about in the proportion as set forth.

Second, The cold alkaline solution, composed of liquid potassa and the chloride of sodium, spirits of ammonia, or an equivalent substance, and water, about in the proportion as set forth.

Third, The bleaching liquid compound of chloride of lime, and sulphuric or other acid, about in the proportion as set forth.

**2,218.—Artificial Limb.—Anton Mennel, New York City. Patented December 20, 1864:**

I claim constructing the shell of an artificial limb of two or more layers of wood, each composed of one or more strips, placed crossways to each other, substantially in the manner and for the purpose herein set forth.

**2,219.—Mode of Lining Pipes with Tin.—W. Anthony Shaw, New York City. Patented March 10, 1863:**

First, I claim forming a double metallic pipe or tube out of any two of the ductile metals or their alloys by pressing them together through, over, on or in a die, in such manner as to make each of said metals form a tube or pipe, the one inside of the other.

Second, Putting the tinned lead together in a cylinder over said mandrel, and forcing them through a die over said mandrel, so as to press a lining of tin in the pipe, at the time of its formation.

Third, The manufacture of lead pipe with a lining of tin, by forcing an ingot of tin and an ingot of lead, while over a core, out of a cylinder through a die, by hydraulic pressure, as specified.

**2,220.—Ruler.—S. L. Simpson, New York City. Patented June 27, 1865:**

First, I claim the spring-stop, d, applied in combination with a valve, a, substantially as and for the purpose set forth.

Second, The index, e, and scale, f, in combination with the link, C, connecting the two parts of a parallel ruler, substantially, as and for the purpose described.

Third, The adjustable pencil slide, F, in combination with the radius arm, D, compass-dial E, and parallel ruler, A, A', constructed and operating substantially as and for the purpose set forth.

Fourth, The clamping screw, k, in combination with the arbor, h, pinion, g, disk, j, compass-dial, E, parallel rulers, A, A', constructed and operating substantially as and for the purpose described.

## DESIGNS.

**2,288.—Cuff and Collar.—William Bell, Jr., Boston, Mass.**

**2,289.—Alphabet Letters.—William H. Carter, Cincinnati, Ohio.**

**2,290.—Statuette and Clock Case.—William A. Giles, Chicago, Ill.**

**2,291.—Clock Case.—William A. Giles, Chicago, Ill.**

**2,292.—Bust and Clock Case.—William A. Giles, Chicago, Ill.**

**2,293.—Pump.—B. S. Nichols (assignor to Downs & Co.'s Manufacturing Company), Seneca Falls, N. Y.**


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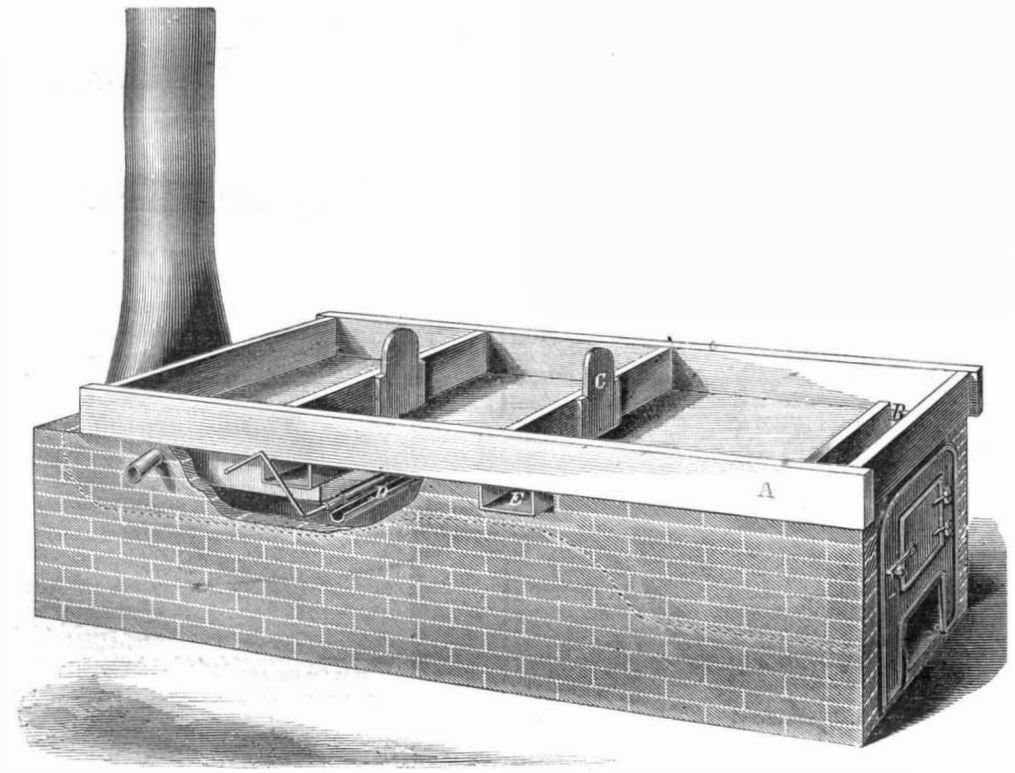
### Improved Sorghum Evaporator.

This engraving represents a new evaporator for making sugar from the juice of the sorghum cane. It is conveniently arranged for the purpose, and is designed to improve the quality of the sugar by facilitating the removal of the scum and preventing the liability of scorching at the final boiling off.

In the engraving, A represents a flat pan divided into three parts. At first the juice is poured in at B, from whence it emerges into the larger partition where it is skimmed, and then allowed to pass successively into the two other compartments through the gates, C, as in all other evaporators. When it comes into the final compartment, there is a damper,




SKINNER'S SORGHUM EVAPORATOR.

D, provided, which shuts off the more intense heat from the pan and allows heated air only to come under it.

There are cold air ducts, E, beneath the pan which tend to check the ebullition at those points, and enable the scum to gather there so that it can be removed before the gates are opened.

This pan is perfectly smooth inside, and can be easily cleaned, in the common way, of all gummy matter, and it is also readily worked on a common arch, saving time and expense of setting many flues and having many dampers.

A patent was procured on it through the Scientific American Patent Agency on October 10, 1865, by E. W. Skinner. Address E. W. Skinner & Co., Mendota Agricultural Works, Madison, Wis., for further information.

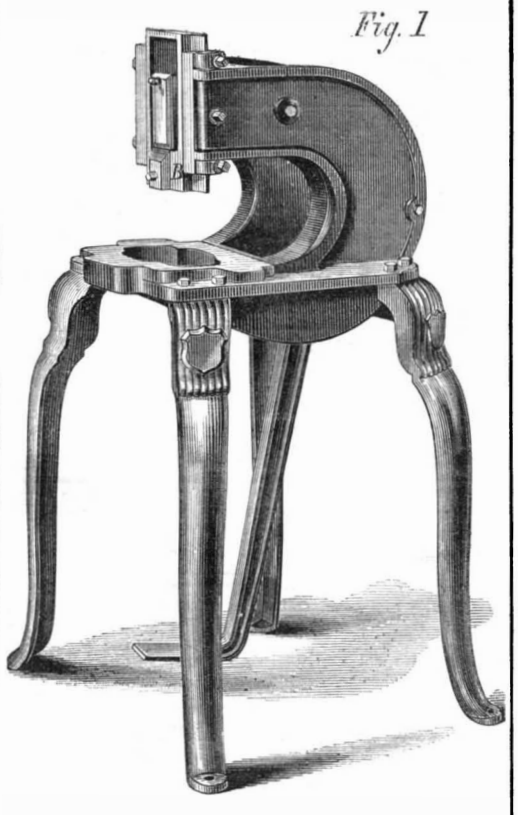
### Electricity in Deep Sea Sounding.

In deep sea sounding the greatest difficulty is felt, even by experienced persons, in ascertaining the precise moment at which the lead of the sounding line touches the bottom—a matter on which the whole value of the sounding depends. An apparatus invented in France, at Lyons, removes, it is said, every difficulty on the point. The sounding line contains within it, along its whole length, two insulated conducting wires, the upper ends of which are connected respectively with the poles of a galvanic battery in the ship. The lead is in two parts, the lower one of which is partly inserted into the upper, and is capable of a limited vertical motion within that of the other, so that, when left to hang freely, a small empty space is left within the upper portion by the spontaneous descent for a short distance of the lower portion. To the upper end of the lower portion, and within the upper portion, is attached a commutator, which is contained in an insulating and water-proof sheath, and which, when the lower portion of the weight is raised by contact with the ground, comes in contact with the ends of the conducting wires, so as to complete the circuit. Instantly, by means of the ordinary electro-magnetic apparatus, a bell is rung on board the ship to attract the attention of the sounder, and a ratchet is thrown into action, which arrests the unwinding of the line from the drum on which it is coiled so that no more can run out. This apparatus is applicable also when the lead is kept hanging down at a certain distance from the ship, of indicating the presence of rocks or reefs, or that the water has become shallow, so as to give timely notice of approaching danger.

### STILES'S FOOT PRESS.

A great many manufacturers use small presses for cutting out sheet-metal work, and are thus enabled to employ cheap labor and produce goods themselves which they would otherwise be obliged to purchase. This applies particularly to hoop-skirt fastenings, mountings for the new wooden pipes which have lately been introduced, pocketbook fittings, album ornaments, and a variety of other things not necessary to enumerate.

Fig. 1

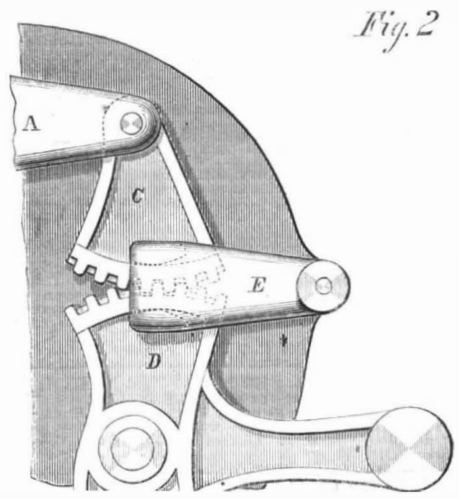


For such purposes the press here illustrated will be found extremely useful. It is operated by foot power, and can therefore be used where steam or water is not employed. Any kind of die can be inserted in the bed and slide, and great power is obtained by the mechanical agents employed. These are shown in Fig. 2.

The lever, A, which works the slide, B, in Fig. 1, has a toothed quadrant, C, jointed to it which is longer from one corner than from the other. That is to say, the teeth are not formed on a circle swept from the center it works on, but from a point independent of it.

The other quadrant, D, is similarly constructed. On each is a flange at the pitch lines of the teeth, so that the latter merely act as so many projections to compel the quadrants to roll together. The teeth are kept in gear by a clamp, E, jointed to the frame —which is free to accommodate itself to the motion

Fig. 2




of the quadrants. The result of this arrangement will be a vertical movement of the upper quadrant equal to twice the difference in length of the sides of one of the quadrants. This, of course, is communicated to the slide, B, through the lever, A. The action is equivalent to that of the toggle joint which is capable of transmitting great power. The quadrants before mentioned are worked by the foot of the operator pressing on the treadle, below the table. The machine is strongly made and handsomely finished.

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